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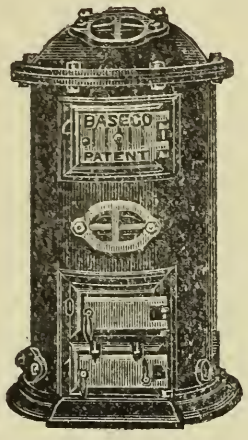

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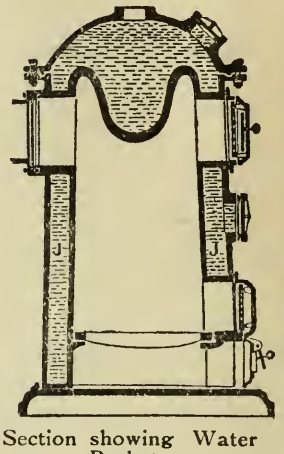

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CONGRESS AT FOLKESTONE.

SECTION C.—HYGIENE OF MATERNITY AND CHILD WELFARE, INCLUDING SCHOOL HYGIENE.

Presidential Address by Mrs. H. A. L. FISHER.

ONE of the most important national assets, economically speaking, is a high level of general health. A nation is maintained, not by some mysterious and bottomless purse controlled by the Government, or by the State or by any other body or individual, but by its own capacity to produce the goods, and render the services in return for which it can obtain not only its primary needs—food, warmth, clothing, shelter—but also those secondary needs which have developed with the development of our civilisation, amusement, interest, travel, and all that they involve. All this is, of course, amazingly elementary, but, nevertheless, it seems to be little appreciated at this moment. Perhaps one reason is that during the war we obtained a great measure of all our requirements, not in exchange for what we were then able to give, but in exchange for our promise to give goods and services at some future time, in other words, we lived upon credit. The result is that we are in debt. We have not only to produce what we need now, or rather what will exchange for what we need, but also enough to pay the interest upon and make some provision for the ultimate repayment of the sums we borrowed in the time of our urgent needs. We are no longer a rich nation able to subsist in part upon the payments in kind of those who were indebted to us, Argentina, the United States, India, the Dominions—who was not indebted to us? To whom had we not in the past supplied large quantities of capital, in return for which we received a yearly contribution of food, or the raw materials of our industries. We are now, and the sooner we recognise it the better, a gravely impoverished nation, owing debts upon which we

shall be obliged to pay interest, and which we must ultimately redeem, and the owner of debts as to many of which it is by no means certain, perhaps hardly even probable, that they will ever be repaid.

We have, in the course of years, and especially in the last decade, developed a high standard of living, and we are extremely reluctant to accept anything lower. Yet, as things are at present, we are wholly unable to meet our debt charges, and to maintain that standard. Industries cannot pay wages which will maintain the standard of comfort of their workers, at least, at the present level of prices. If they are to sell their productions they must be able to offer them at a moderate price. Yet this is just what they cannot do, with all the essentials of production, labour, capital, and raw material, only obtainable at a high price. Capital is dear because it is scarce, and it is scarce because much has been destroyed, and much used to produce not more wealth, but agents of destruction. It cannot become cheap until accumulation has once more taken place, and capital cannot be accumulated when production is at a standstill. Labour is expensive, because wages are higher than industry can bear. Very high rates of wages can be borne, and easily borne, when labour is highly efficient, highly productive. But for reasons which are both physical, the fatigues and exhaustion of the years through which we have passed, and psychological, the unwillingness of large numbers of the workers to produce anything like as much as they could produce, partly because they fear that an unduly large share of that product goes to capital, partly because of the widespread and wholly pernicious belief in the virtue of spreading their efforts thin, in order that more people may be employed. For all these reasons labour is neither efficient, in the economist's sense of that word, nor productive. Lastly, the weight of taxation is tremendous, and this is partly due to our debts, partly to the burden which lies upon us of supporting, or helping to support, those who were rendered incapable of supporting themselves by the war. We have, too, the dependents of those who fell. In the nature of things this burden must diminish as time goes on, but for the moment its weight is considerable.

To put the problem in other words, we must, if we are to be fed, be able to manufacture cottons, woollens, steel, machinery, whatever we can persuade foreign markets to take from us, in order to live at all, in order to obtain our food, such raw materials as we cannot produce, for instance, cotton, or cannot produce in sufficient quantities, such as wool, or those which we can only produce at prohibitive cost. We are, whether we like it or not, an industrial nation, and the problem is how we are to maintain our efficiency as an industrial nation. The aspect of that problem with which we here are specially concerned is that of public health, and the point I want to make

is that it is the business of all of us, as citizens, thoroughly to understand and to make others understand, the fundamental truths which I have stated. Next, it is our business, as enthusiasts or experts in the cause of public health, to drive home to everyone the special public health application of these truths. That is, we must do what in us lies to make clear to everyone the appalling waste, the serious economic danger, of debility and disease. The community consists of those who, directly or indirectly, produce as much as, or more than, they consume, and of those who consume more than they produce. A large part of the second class is made up of invalids. We, who are able to maintain ourselves, expect also to maintain the children and young people, until such time as they are able to maintain themselves. We are also willing to maintain the old, though it is sounder to regard the old as subsisting on part of the excess of what they produced over what they consumed in their productive years. We ought not to expect to maintain, as in actual fact we do maintain, a vast mass of people whose ill-health renders them incapable of wholly maintaining themselves. And not only are we obliged to maintain them, but we have also to support another army of people to look after them, a city of buildings to shelter them, hospitals, sick-rooms, infirmaries, convalescent homes, surgeries. From the point of view of the economist, considering the wealth of nations, and the causes upon which that wealth depends, all this, or nearly all of it, is waste, complete and deplorable. Its removal, or diminution, is not only one of the most obvious, but also one of the most urgent of social needs, if we are to make further progress, if, indeed, we are to have any hope of once more recovering our former degree of comfort, to say nothing of improving that degree.

How many people realise that every man and woman is obliged to give a certain amount of work every day, in order to provide for the sick? The economist tries to point out to the student what happens to the results of his work. He shews that part goes to his own maintenance, and to the maintenance of those who are dependent upon him or who care for him, whether they are mothers, wives, landladies, or servants. Part must be assigned to the replacement of the capital which is every moment destroyed in the process of making more wealth, and unless we are to remain absolutely stationary, without improvement or development, another part must go for the provision of fresh capital. Yet another share provides the essential services of the state, government, defence, order, justice. Another part again must be devoted to those services which the community, in the person of its legislators, has determined to provide publicly, education, lighting, cleaning, and our own public health services. All these are necessary, and socially remunerative. No thinking person would

grudge the work he or she does in order to provide them. We know that they are worth having, and that without them we should be less comfortable, less efficient, than we are. But there is yet more to be provided, before we can turn to trying to supply ourselves, or those dear to us, with any extra degree of comfort, or before we can put aside what we feel we need for old age. We have also to support, either privately, or collectively, through rates, taxes and subscriptions, numbers and numbers of people whom illness or impaired health have rendered incapable of their own support. In so far as any of this is preventable, it is surely one of the leaks in the ship of state which it most behoves us to mend, one of the most potent sources of that waste upon which the gentlemen of the press wax eloquent.

Now, how is this to be done? Do we need fresh legislation? Most of us have probably some special piece of lawmaking which we are anxious to see enacted, nevertheless, most of us would agree that we have a useful body of legislation, and that we can do a good deal with it. Then what about administration? Our administration is as yet anything but perfect; the machine moves in some places with a great creaking and grumbling, and in some places with insufficient speed. But as machines go it is not a bad one, and that it has undergone, is undergoing, much improvement and is capable of much more.

Laws and administration alike are vain unless they are supported by public opinion, and what many of us feel is that what we need more than improved law, more even than changes in administration, is a tremendous awakening of the public conscience. We want the will to demand good health. We have nothing like it as yet. Indeed, of how many of our people is it only too true to say that they literally "enjoy" poor health. Many people, probably most people, wish to keep well, or fairly well, for their own sakes, but how many think of the maintenance of good health as a public duty? How many feel that any one who becomes unwell through his or her own fault, through eating too much, eating the wrong things, drinking too much, or through sexual indulgence, laziness, bad habits, persistent late hours, living in hermetically sealed rooms, is not only sowing the seeds of trouble for himself and his belongings, but committing a grave social crime?

This is the belief we need to inculcate in the mass of the people. It is not likely to be an easy task. but it is of urgent necessity, and we have perhaps a better chance now than we have had before, because all those who served in the war did learn the lesson we want to teach. One of the first duties of the soldier is to become and to remain physically fit, and we have to teach our people that it is also one of the first duties of the civilian. Not only was it learnt in the war years by some millions of men, but also by some thousands of women, who served in the various branches of the women's army.

This is, or should be, an asset of incalculable importance to us, for while it is perhaps true that women even more than men are guilty of the sin of bad health, it is also true that by far the greater part of the burden of the bad health of the community falls upon the shoulders of women. Once we can get it into the heads of the women that bad health is not only unnecessary, but wrong, we shall have accomplished a great part of our task. As every woman knows, men though interesting, are tiresome creatures, hard to control, prone to seek their own way in spite of our warnings. But when women have once grasped the full meaning of the gospel of health, I think they may be trusted to bring it home to the men.

The work is not going to be easy, but that it is possible is shewn by what has happened in the field of Infant Welfare. Those of us, and I am one, who are old workers in this field are only too familiar with the lady who had had ten or twelve children, buried all but one or two, and was not in the least ashamed of it. She regarded herself, and was regarded by others, as a heroine. But she is much rarer now than she was when we began, and she is no longer a heroine. Why? Because of the unremitting and unstinted efforts of those (many of them, as I know you will be the first to acknowledge, enthusiastic and devoted volunteers), who have laboured to prevent and diminish infant mortality. The result of their work has been to arouse a genuine public conscience with regard to infant life. Everyone who is in touch with the mothers is aware of it. The whole attitude has changed, not only of the mothers themselves, but of the outside public. The mothers were always, or almost always, devoted, but they were also fatalistic, inclined to believe in the necessity of many infant deaths, of the necessity of many infant ailments. "If you don't have the white mouth when you're a baby you'll die with it when you are older," my mothers used to tell me. Now most of the mothers realise that it is more normal for a baby to live than to die, and that babies have a right to good health. Twenty years ago the ordinary person neither knew the facts of the infant death-rate, nor did they care to know. If we insisted on boring them with the deplorable figures of preventable death and disease among the babies, they murmured about the survival of the fittest. If, or when, we succeeded in convincing them that the causes which produced the high death rates were also producing a high damage rate, and that we were, therefore, creating unfit rather than allowing the survival of the fit, they began to understand more of what we wanted. At last our views are fairly generally appreciated, and, however, we may quarrel about how many babies ought to be born, and where, we are all pretty well agreed that those who are born ought to be well born, and well reared. Baby Week, the Children's Jewel Fund, the efforts of the Local Health Authorities, the untiring work of health visitors and nurses

and doctors have all helped to arose the mass of the people to the need for child saving, and the means of doing it. The work is actually being achieved. We are all proud of the steady and rapid fall in the infant mortality rate, and the more we realise all that that fall means, the prouder we are. Of course, there is any amount more to do. There are not enough centres, not enough workers, not enough anything, not nearly enough. And we sorely need a greater sense of the responsibility of parenthood. We all know where the weak point is. We have but little trouble with the careful responsible parents, but how much with those who drift irresponsibly into parenthood, the young, the reckless, above all those who become the parents of illegitimate children. Until we can really tackle illegitimacy we shall have one very bad weak place in the armour of our defences against child mortality and child disease. There are, however, welcome signs that the public conscience is awakening to the urgency and gravity of this, surely one of the most distressing of all aspects of the problem of child welfare, and we may perhaps hope for improvement.

What has been done for infant welfare must be done for the whole question of public health. Infants become children, and every child should have as good a chance of health as the babies have now, and better. Most of us feel that the child who is no longer a baby, and is not of school age, is rather apt to fall between two stools. We are trying to prevent the fall, but a good deal more needs to be done before we can regard the child as safe. Then there are the adolescents. Surely here again we have a splendid chance. When once the continuation classes get going, what can we not do, and how enormous is the amount that cries out to be done. The Greek pride in bodily beauty, bodily fitness, is perhaps to some extent reflected in our public schools. Why should it not be better reflected in those schools which have a better right to the name ? We need to make our boys and girls proud of their bodies, ashamed of dirt and disability, we need to arouse a new and healthful spirit among them, and we have the means if we would but use it. If organised games, dancing, swimming, are good for some girls and boys, they are good for all of them. What we have to do is to make our local authorities, who have control of our local finances, believe so passionately in the value of good health that they cannot fail to provide for the needs of the young people. Meanwhile, we have the most brilliant and promising of all modern movements, the Girl Guides and the Boy Scouts, and from them we can hope much. If we can get hold of the young people we may perhaps hope to meet fewer of those distressing persons, with whom we are so familiar, who glory in their infirmities, their weak digestions, their weak backs, their weak throats, their many maladies. We need a new spirit, a new view of life, and why should we not have it ?

The fact that we are a people of city dwellers means many real and grave difficulties. Country people have, and take for granted, many of the things which city people have not even begun to want—open air, fresh food, exercise, no smoke. The problem of maintaining a high level of health among country people is far easier than that which we have to confront, but there are advantages too in the towns. It is easier to guard against damp and cold, easier to arrange for pure water and proper disposal of refuse. But there is much education to be done. If we really wanted to work in comparatively fresh air, instead of in buildings as air-tight as we can make them, it could be arranged. The trouble is that we do not want to, indeed, for all our proverbial love of fresh air 99 out of every hundred of us is more terrified of a draught than of the most virulent microbe. Here again experience has shewn us what is possible. The parents and friends of those children who attend the open-air schools are apt to be overcome with horror when they first realise the fate to which the children are condemned. But time passes, and the children improve, instead of being blown to destruction. Let us hope that as open air schools, and open air classes, increase, we shall gradually break down the widely held belief that it is necessary for our welfare to live, if not hermetically sealed, at least very tightly enclosed. Why should we ? Why should our rooms have four walls instead of three ? Why should we endure the curse of smoke ? As long as we shut off the rays of the sun by a pall of smoke, there is less temptation to enjoy the open air, and the unfortunate woman who has to do the washing with the aid of the most primitive appliances may be excused for keeping her windows shut, in order to keep out the devastating rain of smuts which lurks without.

Why should country people play cricket or football on Saturday afternoons, and townspeople go to watch others play ? I never pass our own village common on Saturday afternoon without thinking of the enormous crowds of weedy youths who used to pour, and I suppose pour still, from the Sheffield grounds at the close of a match. Another of the lessons which we must instil is that it is better for the young, and even for the moderately young, to play a game badly than to watch it well played. The habit of looking on is not one that is likely to produce good health. I have already exceeded the limit which I planned for my remarks, and I will only suggest the need for improvement in our feeding and clothing. I am not sure if we have gone quite the right way in the matter of food. Some women like cooking, others do not. Yet we continue to assume that every woman, whether she likes it or hates it, should cook. Is it any wonder that so many of us have impaired digestions ? Is it not time that we accepted cooking as a skilled job, which should be done by those who have, and rejoice to have, the necessary skill ? Is it not possible that we may help to solve the smoke

problem, as well as the problem of the most overworked of all British human beings, the ordinary housekeeper, by a franker recognition of the principle of the division of labour as applied to the cooking and preparing of food? We are better clothed, the children above all. Fewer children are sewn into their garments at the beginning of winter, fewer children are burdened with the endless petticoats which used to be their habitual attire. I do not know that I can say as much for the grown ups. Man is conservative, but woman changes. We no longer screw in our waists, which is certainly a vast improvement, but we distribute our garments in a manner which may be fashionable, but is scarcely sensible. They seem to accumulate near the middle, but there is remarkably little at either end. And of heels the less said the better. I am becoming frivolous, and I will stop. But I hope you will all agree with me that the great and the pressing need now is not more laws, not even more ministries and more administration, but a great awakening in public opinion, a new spirit with regard to the questions of public health. You, the experts, have done so much, it remains for us, the public, to do our part. Till we do, there is little hope of great advance. But you must make us realise the urgency of the need, the magnitude of the opportunity.

The Relationship between Overfeeding and Wasting in Children.

By Vynne Borland, M.B., Ch.B., B.Sc.Glas., D.P.H.Lond.

(Abstract).

OVERFEEDING in children may occur in the three methods of feeding, namely :—

Breast-feeding ; Supplementary or Complementary feeding ; Artificial feeding.

The effects and results in all are essentially similar. The transition from normal to wasting passes through the following stages in sequence, which may be definite or ill-defined :—

Regurgitation after feeds.

Disturbance of metabolic equilibrium.

Dyspepsia ; this may occur primarily after regurgitation.

Actual wasting or marasmus.

The departure from normal may be caused by :—

Too large quantities of a food containing proper proportions of constituents either from too frequent and irregular feeding or regular feeding with too much.

A relative overfeeding with a food containing a relatively high proportion of one or other constituent or all.

Symptoms usually begin with discomfort and regurgitation after feeds. The infant's tolerance and digestive powers may be increased and so effect a spontaneous cure. If not, the metabolic equilibrium is upset or dyspepsia appears with gastro-intestinal disturbance. The weight at first may show a rapid rise, then remains stationary for a time and finally begins to fall, with accompanying wasting to a lesser or greater degree according to the extent of the metabolic disturbance.

In children beyond infancy the symptoms as a rule are not so acute, but may be recognised as those of chronic gastro-intestinal indigestion resulting from a too liberal intake of carbohydrates and farinaceous foods or too much of a properly constituted diet and irregular meals.

The child becomes pale and anæmic with stationary weight or actual loss.

A paradoxical reaction is to be observed in the treatment, namely, increasing the food aggravates the symptoms and causes a further loss in weight.

Preventive Measures.

In breast-fed babies regulate the diet of the mother. Feed at regular intervals during the day and give no night feeds. Regulate the quantity according to the progress in weight and the character of the stools.

In supplementary or complementary feeding begin with small quantities and allow 3 or 4 days to elapse before deciding to increase the quantity.

In hand-fed babies, do not give a food containing more than 4 per cent. fat or 8 per cent. carbohydrates. Increase quality or quantity or both slowly and deliberately. Avoid generally starchy foods until 9 months. Consider the environment of the child.

In older children give foods requiring mastication, avoiding too much sloppy food. Give nothing between meals except water.

Avoid overfeeding in treatment of constipation.

The following took part in the discussion on this paper :—Dr. John Robertson (Birmingham) ; Dr. G. E. Oates (Bethnal Green) ; Dr. George Millson (Southwark) ; Miss Amy Hughes (London) ; Dr. E. Johnstone Jervis (Leeds) ; Mrs. E. Fuller (Dover) ; Dr. W. M. Branson (Halifax) ; Dr. D. C. Kirkhope (Tottenham) ; Mrs. Jenner (Folkestone) ; Mrs. S. J. Ebury (St. Pancras).

The Backward Class versus The Special School.

By G. A. Auden, M.D., M.A.(Cantab.), F.R.C.P.(Lond.), D.P.H.(Cambs.), School Medical Officer, Birmingham (Member).

MORE than twenty years have now passed since local education authorities were enabled by statute to supply a special type of education for certain children, who failed to profit by the ordinary routine of primary education. The Elementary Education (Defective and Epileptic Children) Act, 1899, adoptive and permissive though it was, like the compulsory education of the blind and deaf, was the logical outcome of the national educational system inaugurated in 1870. But during the present century, a profound change has taken place in our outlook, and the time is ripe for a re-survey of the whole problem of the education of mentally abnormal children.

In this connection, it is an interesting study to contrast the different method of approach to the problem, which was followed at the outset in England and France respectively, for it shews how great an influence on current thought may be exercised by the chance use of a particular terminology.

In England, when in 1896 a Departmental Committee was appointed, one of the terms of reference thereto was " to report particularly upon the best practical means for discriminating between the educable and non-educable classes of feeble-minded and defective children."

> Now, as the members of that committee point out in their report, " the word ' feeble-minded ' has presumably been adopted in the terms of reference to us in consequence of its having been used in the report of the Royal Commission on the Blind, the Deaf and the Dumb, etc. That Commission appears to have taken the use of the word from the Royal Commission in the Education Acts."

As a matter of fact it is difficult to trace how and when this word " feeble-minded " acquired its present connotation. It does not occur, for instance, in the Report of the Commission on Criminal Lunacy, 1882, which deals very largely with that class of defective delinquent now known as " feeble-minded " under the general term " weak-minded." The word " imbecile " is, however, frequently used to denote the same type of mentally-deficient person. In fact, the two terms appear to be used quite interchangeably, a

usage in full accordance with various Acts of Parliament dealing with criminal lunatics. Thus Dr. Mitchell, writes :—*

> "As ordinarily understood, an imbecile is a person labouring under any degree of mental imperfection, originating congenitally, or in very early life, which unfits him for the full performance of his duties in the position in which he is placed. The nature and degree of such imperfections are infinitely various."

Yet when the Royal Commission was appointed in 1904, it received the general title of "The Royal Commission on the Care and Control of the *Feeble-minded.* The word is thus used, as it is in America to-day, as a general term to cover the whole gamut of mental defect. On the other hand this same Commission in its report once more restricted the use of the word to one particular sub-division of mental inefficiency.

The word "feeble-minded" has thus crept into use without any clear definition or understanding of its connotation. Its use in the terms of Reference to the Departmental Committee inevitably centred attention upon one particular portion of the field of intellectual inefficiency which has continued to engross our attention, somewhat to the exclusion of other portions.

That this danger was recognised by the Committee may be inferred from the following statement (p. 3) in their report :—

> "From the normal child down to the lowest idiot, there are all degrees of deficiency in mental power ; and it is only a difference of degree which distinguishes the feeble-minded children, referred to in our enquiry, on the one side from the backward children who are found in every ordinary school, and on the other hand from the children who are too deficient to receive proper benefit from any teaching which the School Authorities can give."

But the Elementary Education (Defective and Epileptic Children) Act, 1899, which was the outcome of the report of this Committee, failed to compass the same width of view, and attempted to draw a clear and definite line between the dull and backward on the one hand and the imbecile on the other. The result has been that the children of the lower grades of educational capacity have received a preponderating share of attention while the dull and backward have been left very largely to shift for themselves.

In France, however, a different evolutionary process is to be observed. There, as in England, the problem of the child of abnormal mentality attracted the notice of psychologists, educationalists and physicians, but

* (Appendix to Report, p. 166).

it seems to have been backwardness and dullness in educational capacity rather than the more pronounced types of defect which attracted attention. The terms still in use : Arriérés, Débiles, Retardataires, to describe the same type of children known in England as feeble-minded, are proof of this tendency. Thus Boncour (*L'éducation des anormaux, 1910*, p. 5), writes :—

> " On relève du déficit intellectuel et les écoliers sont dit atteints d'arriération, de débilité. On les appelle aussi rétardataires. Ces dénominations sont équivalentes. Dans l'échelle des anomalies mentales par défaut nous distinguons trois degrés : l'idiotie, l'imbécillité, l'arriération." *

That this point of view was general can further be gathered from the fact that, in 1904, the Minister of Public Instruction nominated as a member of a Commission appointed to organise classes for sub-normal children in the primary schools of Paris, Professor Binet, who for years had been studying the problem of mental development. It was under such circumstances that Binet, in collaboration with Simon, produced his scales of intelligence, which have revolutionised our conception of mental capacity and educational progress.

A word which frequently appears in the volume of evidence before the above-mentioned Committee is " feebly-gifted." This term, extensively used in Scandinavia and Germany, has unfortunately completely dropped out of use. It has, however, much to recommend it for it tends to emphasise the educational incapacity and is free from the stigma which unfortunately has come to be attached to the word " feeble-minded." Moreover, experience has taught us that it is the retarded, feebly-gifted children who form our real educational problem. The problem of the feeble-minded is in reality social rather than educational, and it can only be effectively dealt with by sociological methods. This differentiation between the educational and sociological points of view is of the greatest practical importance.

How important is the retardation problem may be gauged from the fact that from 10 to 15 per cent. of the children in our Elementary Schools are too dull and backward to gain full advantage from the education offered to them at such an enormous cost to the community. If education is to be the solution of our social difficulties, then it is imperative that we should make a beginning to deal with the question. Until some system of grading other than the rule-of-thumb method of promotion from class to class in

* This is equally true of German nomenclature, viz. :—Idiotie, Imbezillität, Debilität. (Bosbauer, p. 14.)

accordance with chronological age had been devised, it was quite impossible to ascertain what proportion of children in any group were being taught in accordance with their ability to learn. While the mental laggards have failed to assimilate the teaching provided for them, the natural intellectual progress of the quicker-witted and more intelligent children has been retarded. Thus the loss, due to the failure to secure classes or standards of homogeneous mental ability, is a two-fold one.

Terman,* speaking of certain American schools, in which a careful investigation had been made, writes as follows :—

> " Notwithstanding the sifting which takes place at the end of each school year, the resulting classification of children has been so far from successful that, generally speaking, the lowest 25 per cent. of pupils in any grade belong mentally to a lower grade and the highest 25 per cent. to a higher grade. Only the middle half are classified approximately where they should be. Usually more than 15 per cent. are at least two grades removed from the one to which they belong by mental age."

The researches of Burt in the Elementary Schools of a representative Borough of London teach the same lesson. By a careful estimation of the ability of children in the Elementary Schools, he found that about one tenth of all the children between 5 and 10 years exhibited two years retardation. In addition, 25·6 per cent. (*i.e.*, more than a quarter) were one year behind their actual age, and only 46·4 per cent. were assigned to a grade or standard assumed to be normal for their age. Moreover, of the children over 9 years of age, 4·2 per cent. appeared backward by 3 years or more. Examining the same figures from another point of view, Burt came to the conclusion that, " in round numbers over 2,000 children in this borough—at the very least 10 per cent. of the senior school population—are definitely backward."

Further, between the " normals " and the " defectives " there was a distinct overlap—one group merging continuously into the other. There is no gap between them :—

> " The children in ordinary schools who were backward by four or five tenths of their age might well have been admitted at an earlier age to a special school. The defectives who were backward by only one or two tenths of their age might well be returned to the ordinary schools. The mixed group who were backward by 25 to 35 per cent. of their age are borderland cases, some of whom have been sent to special schools and the rest left in

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*The * Intelligence of School Children*, p. 27.

ordinary schools, in virtue of the various ways in which their condition was interpreted or overlooked."

A more recent investigation has been carried out by Burt in eight representative Birmingham schools (1920). In this investigation all children whose mental ratio (*i.e.*, mental age to chronological age) was below 85 per cent. were categorised as backward, while all whose mental ratio was below 70 per cent. were considered to belong to the group of the feeble-minded.

Among 1,751 children, the following results were found :—

	per cent.		
Retarded but normal	5·2		
Backward in reading	1·2	increase	10·2
Backward in arithmetic	3·8		
Dull and backward	11·1		12·3
Borderline cases	1·2		
Feeble-minded			·3

Thus 22·5 per cent. were behind the average and were thus unable to keep the pace of their fellows, and of these 12·3 per cent. belonged to the dull and backward group. The percentage of those who marked out as feeble-minded has, of course, been influenced by the existence of Special Schools to which a certain number of children from this sample school population have been admitted.

The secret of success in dealing with this question lies in a recognition of the fact that the distribution of human intelligence is of that type which is known to mathematicians as a normal curve of frequency. A distribution of this kind is always the result of the action and interaction of a very large number of causes working independently. The distribution of the height of the members of a community follows the same type of curve. This is equally true of educational ability as distinct from general intelligence. In other words, educational variability appears to be of much the same order as physical variability. Such a distribution of intelligence, if governed solely by mathematical principles would make the low grade idiot as rare as the genius. Unfortunately, however, this is not our experience, and it is clear that whatever the distribution of the higher ranges of intellectual capacity and genius may be, there are certain factors which markedly upset the normal distribution as we descend the lower rungs of the mental stairway, and lead to a much larger number of mentally incapables than would be predicted by mathematical computation alone.

When we have grasped this fact, we realise that the practical problem assumes the two aspects already mentioned in this paper, viz. : the social and the educational or psychological. The social aspect of the problem

will include the attempt to discover those factors which disturb the normal distribution of mental capacity and to reduce their range of action by sociological, eugenic or other appropriate measures.

The second or psychological, aspect of the problem will be how to secure, by a recognition of the infinite grades of mental capacity, the best and fullest measure of activity of which each individual mind is capable. This is the question which concerns us most at the present moment.

Judged by numbers alone, the problem of the backward child looms much larger than that of the feeble-minded. The Departmental Committee estimated 1 per cent. of all Elementary School children as feeble-minded.* The Royal Commission on the Care and Control of the Feeble-minded, placed the percentage at 0·79.† We have already said that the number of backward or retarded children who need special provision reaches 10 per cent. or even 15 per cent. of the whole school population.

What then is the remedy ?

The first point must be to secure homogeneity in general educational ability of the children in each class, with a flexible system of promotion from class to class, standard to standard. As, however, has been shown by Burt in his Birmingham investigation, ability in different school subjects, varies within wide limits and with but little strict correlation to each other there must be cross-classification for different subjects. Next, there must be " Repeater classes " for those children who drop behind their fellows and are not ready for promotion at the end of the school year.

This is no new proposal, for it is an integral part of various Continental educational systems. But a complete solution of the question will not be found in a haphazard formation of backward classes, unless their establishment is associated with an organised system of mental testing whereby the educational needs of the individual children may be gauged from time to time.

There still remains the problem of the super-intelligent children, to whose educational progress the presence of their duller classmates acts as an effective brake. To quote Burt again :—*

> " If the child population and the community at large have profited by the establishment of special schools and classes for the educationally incompetent, much more would they profit by refining the procedures for discovering and training those who are the most efficient of their age."

With such a system the overlapping between the " ordinary " and the " special schools " would tend to disappear and the latter would with a

* Report, p. 6.
† Vol. I., p. 9.

slight change of character and curriculum fall into their proper place in an organised educational scheme. Without attempting the futile Sysiphean task of inculcating a formal education which the enfeebled mind fails to grasp, they will serve a more useful purpose in giving an effective practical education to those who must earn a living with their hands rather than with their heads. They will serve, moreover, as ante-rooms for the colonies which will come into being for those whose conduct has proved that they are unable " to manage themselves and their affairs with ordinary prudence."

In the State of Massachusetts, legislative action has now been taken on these lines. By Chapter 222, General Acts of 1919, it is enacted that every city and town shall annually ascertain the number of children three years or more retarded in mental development who are in attendance at the public schools, and that there shall be in each town, where there are ten or more children so retarded, special classes to give instruction adapted to their mental attainments.

As Dr. Fernald writes in his report for 1919 :—

> " Defectives so trained are very likely to become industrious and well behaved adults . . . Much of the necessary rough work of the world is performed by people who could not pass the modern mental tests. . . . Many defectives have innate character defects and need the institution—the well-behaved and industrious defectives should be allowed their liberty, and should not take the places in the institutions of those unsuitable for community life." (p. 21).

It is in this direction that the Special Schools will be likely to play the principal part in the future.

Hitherto we have been too much obsessed with the educational aspect of feeble-mindedness, and have laid too great a stress upon its importance. We have spent our energies in an attempt to educate those who cannot learn, who cannot compete in the race of life, rather than in an attempt to afford help to the backward child, who, slow and dull though he may be, may yet win a prize in the race, even though it may be only a consolation prize. Even if he should fall short of success yet at least he has the capacity to appreciate " the rapture of pursuing," which is not the guerdon of the vanquished alone.

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* " Distribution of Ability," p. 44.

Triple Ideal for Child Welfare Centres and a Note on the Infant History of Rickety School Entrants.

By Harold Scurfield, M.D., D.P.H., Formerly Medical Officer of Health, Sheffield (Fellow).

IT is a good thing to have before us in child welfare work a definite aim, and that a suitable one for the purpose would be *no rickets, good teeth* and *nose breathing*, and to test our advice and methods by this standard, especially in the light of the new knowledge with respect to vitamines.

Rickets.

1. We must see that the diet of the expectant and nursing mother contains such things as will supply her with the anti-rachitic vitamine, the right kind of fat, such as milk, butter, dripping, suet, fat fish like herrings, and green vegetables such as cabbage and lettuce, not forgetting cod liver oil as a stand-by. With regard to this last, a Grimsby firm is putting on the market a 50 per cent. emulsion of cod liver oil without hypophosphites at 10s. per gallon, or under, which ought to be a boon to child welfare centres.

2. We must see that the infant is breast-fed.

3. We must see that the infant after it is weaned gets its supply of the anti-rachitic vitamine in food similar to that mentioned for its mother, but suited to its age.

It is also important to make sure that the weanling and child as it grows has food from which it can derive the necessary amount of calcium both for its bones and teeth. The common sources of calcium are milk, cheese, wholemeal bread, oatmeal and green vegetables, such as cabbage and lettuce.

Probably the most convenient source of calcium is milk, but cows' milk cannot be given to children raw on account of the danger of conveying tuberculosis and infectious diseases such as scarlet fever, diphtheria and enteric fever. Milk is often impoverished by boiling in the home. Pasteurisation of milk is often a farce. A simple home pasteuriser devised by Nathan Strauss is satisfactory. Dried Milk will be preferred by many people and is safe as regards infectious diseases. Moreover, the value of the vitamines is retained, especially if the milk is desiccated by the Just-Hatmaker process. Dried milk is stable in composition and can be given to children in many other ways, when, as sometimes happens, children do not like drinking milk. Whether the milk is pasteurised or desiccated it is important that the cows should be fed as much as possible on green food in order that the milk may contain the all-important vitamine. I used to think that city

cowsheds were an advantage by bringing fresh milk within the reach of the consumer, but one has to recognise that, in view of the latest research, stall-fed cows probably give milk deficient in the properties necessary to prevent rickets and to build good teeth. In fact, all the lessons of the vitamine research tend in the direction of more natural and less artificial feeding, and warn us that when we live in towns we run risks that we have to learn to remove. We have not finished learning yet.

GOOD TEETH.

Mrs. Mellanby has shown that we need the same kind of food for building up teeth with good enamel as we do for preventing rickets. Dr. Sim Wallace does not attribute the same importance to the rôle of food in building up good teeth, that will resist decay, but, as the dietary mentioned is necessary for preventing rickets, he will perhaps forgive us if we become disciples of Mrs. Mellanby. As the enamel of the teeth is not completely formed till about the 18th year a reasonable amount of milk should be included in the dietary through childhood and adolescence.

For obtaining and maintaining good teeth we need other things as well as the three already mentioned.

4. Food for the child after weaning that will make it chew, and

5. Nose-breathing, so that its jaws may develop in the right way.

Incidentally one may mention that breast-feeding, already included in the programme, also conduces to the proper development of the jaws. When the teeth with well-built enamel have erupted in the roomy well-shaped jaws we need to give attention to them

6. The prevention of decay. This is the stiffest part of the campaign, as it runs counter to the widespread vice of sweetsucking at all times. Doctors and dentists are agreed that the microbes which cause decay get their chance by fermenting in the starchy and sugary matter which settles in between the teeth. Doctors are also now agreed that three meals a day and nothing in between is the best rule for the digestive system of the normal child. If sweets are to be taken they should be taken during a meal and each meal finished with a tooth cleansing food such as a bit of apple, lettuce or nuts, and a drink of water. For epicures I can recommend salted almonds with black coffee!

Of course, no biscuits or cake between meals. Probably an ideal tooth-rotting scheme is to give a child biscuits and a glass of milk after it has got into bed, leaving the teeth clogged up for the night.

If a maiden aunt wishes to force sweets on your children, direct her benevolence to apples and dates instead. Very small children are interested in the rationale of the scheme if it is explained to them.

Brushing the teeth up and down after each meal might do, but is difficult to carry out, and a tooth brush is often a thing of dubious cleanliness.

It is surely worth some effort to try and prevent dental decay and oral sepsis. More and more diseases are being credited to this source of bad health every day.

Nose Breathing.

Nose-breathing, third item of the triple aim, has already been mentioned, and is, I think, the weakest spot in the advice given at our welfare centres at the present day.

The advice to the mother to teach the baby to breathe through its nose is altogether too vague. The baby will breathe through its nose without being taught if its nostrils and nose are clear. How is the mother to keep them clear ?

Nurse Margaret's Book on Babies, issued under the ægis of the Association of Infant Welfare and Maternity Centres, is a very good book in most respects, although too elaborate and extravagant for the mother of moderate means. Its advice on this subject is hardly practicable, *e.g.*, p. 57, " clean the lower part of the nostrils very gently with a scrap of absorbent wool dipped in boracic lotion " ; p. 87 " Keep his nose clean " ; p. 114 (for obstructions) " Blow the little nose vigorously," and again, p. 115, " Blow his little nose hard."

Some recommend dipping a pledget of cotton wool in olive oil or boracic lotion and gently removing the mucus with it. Others say this only pushes the mucus into more inaccessible places.

Dr. Octavia Lewin recommends sniffing with Hudson's Dry Soap to excite a free flow from the nostrils which brings the dried mucus with it. Hudson's soap consists of approximately 38 per cent. sodium carbonate, 26 per cent. dry soda soap and 36 per cent. water, and presumably the soda forms a soap with the fatty matter in the mucus.

Dr. Waller swears by a little speck of yellow oxide of mercury ointment in each nostril for the purpose of curing the chronic or sub-acute catarrh which so often prevents a baby from breathing through its nose, and if this is not effectual a drop of a colloidal silver salt.

My reason for mentioning these details is as a plea for study of this important question—how to keep a fairway through a child's nostrils so that it may not become a mouth breather.

Mouth breathing leads to adenoids and adenoids increase the need for mouth breathing. How far the dummy teat helps to cause mouth breathing I don't know. I believe the constant habit of whistling gets some children into the way of mouth-breathing, though one would be loth to suggest humming as an alternative.

SIGNS OF RICKETS IN SCHOOL ENTRANTS.

Just before the war we began an enquiry in Sheffield as to the infant history of children who were reported by the School Medical Officer to be markedly rickety on being admitted to the elementary schools.

The enquiry was broken off, and has just been resumed. I submit a tabulated statement of the first 70 of the cases reported, of which we had birth notification cards.

The information in the 70 cases is taken from the birth cards at a time when the rickets as a rule has caused slight or no symptoms, so it may be said to be quite unbiassed ; *i.e.*, the visitor, of course, did not know rickets was going to be pronounced. I may add that, as might be expected, the mother's memory of how the child was fed during its first year is quite untrustworthy when the child has reached the school age.

Marked rickets, perhaps, almost implies something unsatisfactory about the home conditions, as with a reasonably good home and a careful mother one would expect treatment to be obtained soon enough to prevent marked deformity. The homes might be classified as follows :—

Old Slums, 12 ; New Slums, 7 ; Congested Working Class areas but not slums, 37 ; Working Class areas (not congested) 14 ; Total, 70.

The history of feeding taken from the birth cards was as follows :—

Entirely artificially fed, 3 ; Breast fed (entirely or partly) for less than 6 months, 13 ; Breast fed (entirely or partly) for over 6, but under 12 months, 11 ; Still partly breast fed at 12 months, 40 ; Incomplete information as to feeding, 3 ; Total, 70.

The following statement shows the position of the child in the family :—

1st child in	5	cases.	6th child in	10	cases.	11th child in ...	4	cases.		
2nd ,,	6	,,	7th ,,	12	,,	13th ,, ...	1	,,		
3rd ,,	6	,,	8th ,,	5	,,	Could not ascertain	1	,,		
4th ,,	5	,,	9th ,,	2	,,		—			
5th ,,	12	,,	10th ,,	1	,,		70	,,		

The present number of children in the families is as follows :—

1 child in	1	family.	7 children	13	families.	12 children in	4	families		
2 children in	4	families.	8 ,,	5	,,	13 ,,	1	,,		
3 ,,	5	,,	9 ,,	11	,,	Could not ascer-				
5 ,,	6	,,	10 ,,	3	,,	tain ...	4	,,		
6 ,,	10	,,	11 ,,	3	,,		—	,,		
							70			

In both of the above tables the numbers refer to children born alive. Stillbirths and miscarriages are not included.

In very few cases was another child born within a year or so after the child which developed rickets, so that the neglect of the ex-baby on account of the arrival of another baby did not seem to be a factor of importance. The following table shows this :—

In	1	case	the interval was	1	year and 6	months.
	3	cases	,,	1	,, 7	,,
	3	,,	,,	1	,, 8	,,
	3	,,	,,	1	,, 9	,,
	2	,,	,,	1	,, 10	,,
	1	case	,,	1	,, 11	,,
	20	cases	,,	2	years.	
	10	,,	,,	3	,,	
	6	,,	,,	4	,,	
	1	case	,,	5	,,	
	1	,,	,,	6	,,	
	1	,,	,,	7	,,	
	14	cases	no child was born afterwards.			
	4	cases	information was not obtained.			
	70					

In 42 cases out of the 70, the last note on the birth card (usually from 12 to 14 months after birth), described the child as being fairly normal, so that the rickets evidently developed in the second year. In 21 cases the child was decidedly below the normal, although not shewing, perhaps, definite signs of rickets. In 6 cases there were decided signs of rickets. In the remaining case the child was only six months old at the date of the last visit.

We know from observation how little milk the toddlers get in homes like this, and how frequently bread, margarine and jam form the staple articles of their dietary, just the kind of dietary that would produce rickets in dogs.

We have, therefore, quite enough information to indicate the need for a more determined effort to follow up the babies after the first year and to try and secure for them during the second and subsequent years a dietary containing more milk and the right kind of fat.

It would be interesting to have an examination of the teeth of all rickety entrants by the school dentist.

I apologise for putting forward this crude statement, but I think an enquiry on improved lines all over the country would give interesting and instructive results.

The Dental Clinic in Relation to the Prevention of Physical Defects.

By F. Constant, L.D.S.

TO those who are most closely in touch with the working of the Dental Clinic, and are aware of its actual and potential value, the careless and matter-of-fact attitude towards it which is taken by the general public would occasion surprise, were they not uncomfortably aware that it is an attitude adopted also by many members of the medical profession itself. And yet it is just as certain as that day follows night, that one of the most potent factors in the great problem of the best means to improve the health of the people will be the Dental Clinic. Here is the means for watching and guarding the first outpost of the health of the individual, not only from birth onwards, but even in the ante-natal state. By this means, it is no exaggeration to say, one can not only feel the pulse of the nation, but to a large extent influence and control it. Many of the ailments of the bulk of humanity are directly due to bad teeth, many others are traceable to the same cause. Anæmia, ear and eye troubles, glandular enlargements possibly leading to tuberculosis, nervous diseases, joint affections, neurasthenia, intestinal complaints—truly an appalling list. Oral sepsis and its attendant ailments are the outcome of the deplorable condition of the mouths of the greater proportion of the lower classes of the country, mainly due, perhaps, to apathy and ignorance, but largely contributed to by the lack, until recent years, of any effectual effort on the part of the governing authorities to combat the evil. Fortunately we are now on the right track, but there is a lot of leeway to be made up. But we shall reach the point at which we aim by the aid of the Dental Clinic.

The Dental Clinic is associated or should be associated with a Maternity and Care Committee. This Committee concerns itself with the welfare of the expectant mother as regards dental treatment which will render her mouth healthy, and thus prevent any septic absorption which, it has been proved, so seriously prejudices the health of her offspring, and, after the birth of the child, with imparting information on the importance of breast-feeding and diet, and the warnings against the artificial teat and bottle-feeding. After the child is weaned, the question of diet becomes important —a matter of indeed far greater importance than is usually realised. It is here that the greatest help may be looked for from the Dental Clinic in the future, because it is by the statistics tabulated in the Clinic, and only by these statistics, that the health of the mouths of the children, and

consequently the health of the children of the nation can be shewn. In this relation some remarkable figures are given. They present a problem which might possibly have the effect of changing or modifying the nature of our diet. They refer to the dental inspection of the children between the ages of 5 and 8 in the elementary schools in Folkestone, in the years 1918-21, inclusive.

1918,	881	examined,	33	sound —	3·7 per cent.
1919,	572	,,	69	,, —	12 ,,
1920,	799	,,	178	,, —	22 ,,
1921,	962	,,	243	,, —	25 ,,

It will be seen that in 1918 only 3 per cent. of the children examined had sound teeth. In 1919, 12 per cent., 1920, 22 per cent., and this year the figures just completed show no less than 25 per cent. There is no reason to doubt that this improvement is fairly general throughout the country. This gratifying result may be attributed, perhaps, partly to the first results of the services of the excellent Maternity and Care Committees, but there can be little doubt that the primary cause is the simpler diet necessitated by the exigencies of the war. For, remember, the teeth of the children inspected in 1918 were fully erupted on the average five years previously, i.e., in 1913—almost two years before the war. The teeth of the children inspected this year were fully erupted in 1916—nearly three years after the war commenced. In 1913 food was cheap and continued so until 1916. After the war started sugar, sweets, milk, etc., became dearer and presumably scarcer in every household. Bread, too, became coarser in 1916. Thus, it will be seen that the teeth of the children inspected in 1918 were erupted for three years before the prices of food increased, whilst those inspected this year were not erupted until nearly the highest point had been reached in the values of food.

The need for the attendance of children at the Clinic for inspection and treatment at the earliest possible age can be scarcely too strongly insisted on. At six years of age, many permanent molars are hopelessly carious. At five, many temporary molars are in the same condition, and the problem is presented of extraction and consequent deficient lack of masticatory apparatus combined with possible later permanent irregularities, or septic absorption with all its possible and probable grave results. Children of tender age are not as a rule good subjects for " instrument " treatment, but a few minutes' advice to the mother may mean much benefit to the child. Children should be re-inspected every three months. Six months is too long, as in that period a tooth may become carious and break down into a cavity sufficiently large to be very painful to the patient to stop. With re-inspection and necessary treatment every three months until the

age of 14, there is no reason why nearly every child when it leaves school should not be dentally sound.

It will be seen that the influence on the child of the Clinic and its associated Maternity Committee extends from the ante-natal stage to the finish of its school career. The attention and advice given to the mother conduces to the child's arrival in the world in a healthy condition, and if the after care of the child be on the lines laid down for the mother's guidance, the jaws and air passages should develop normally, and at the age of five the child's teeth should be without caries. This desirable state of things can only be brought about by the intelligent care of the child by the parent, and every effort should be made to impress upon the mother's mind the enormous importance to her child of her strictly carrying out the advice given her. This advice would cover the point of proper diet. The question of the nature of an ideal diet from the dental point of view is outside the scope of this paper, but it may be said that the Dentist at a School Clinic cannot but notice that the children of the poorer families—those who have few luxuries, jam, sweets, soft foods, etc.—have the best teeth. The value of sound teeth in its bearing on the general health of the child cannot be too strongly insisted on.

Comparison by the School Medical Officer of the physical condition of the children whose mouths are in good condition, with that of the children suffering from bad teeth would reveal a difference in the former's favour. This is so at even the early ages, but when the comparsion is between children of say ten or twelve, the difference is marked.

Enough has been said to indicate the serious responsibility which devolves on parents to see that their children not only attend regularly at the School Clinic, but that they are strict also in their observance of the rules laid down by the Dentist for their guidance in the care of their teeth. It is, however, a regrettable fact that this responsibility sits but lightly on the shoulders of many of the parents, and that the penalty of their sloth or ignorance is paid by the children in unnumbered hours of pain and ill-health.

It will be seen that the steps which have been taken during the last few years should secure to the child proper dental attention throughout its school age, and should turn it out into the working world equipped with a properly functioning masticatory apparatus. But what after that? It is to be feared, nay it is practically certain, that in a large number of cases the boy or girl will neglect his or her teeth. From the point of view of the working classes, private dentists' fees are large, and dental hospitals are few and far between. There is as yet no public dental or national

dental service in the country. And so the teeth of the careless ex-scholar get bad, and from bad to worse. The result is not difficult to imagine. The condition of the mouths of the majority of the working classes of this country is known to be very bad. The deplorable state of things revealed in the evidence before the Committee appointed by the Lord President of the Privy Council to inquire into the gravity of the evils connected with the practice of dentistry by unqualified persons, so impressed one of our legislators that, after making full inquiry, he determined to take steps to set up an institution in the district which he represented, which would enable the poorest of his adult constituents to obtain, at a nominal cost, similar dental treatment to that at the command of those in better financial circumstances. This, of course, refers to Sir Philip Sassoon, by whose public-spirited generosity Folkestone possesses a Dental Clinic at present unique, and which it is to be hoped will, in the future, lead to far reaching results as the forerunner of a National Dental Service. The scheme elaborated by Sir Philip Sassoon, co-ordinates an adult clinic with the school clinic, and secures to the ex-scholar a continuity of dental treatment from the hands of the School Dentist. The Sir Philip Sassoon Dental Clinic for Adults consists of a fully equipped surgery and mechanical laboratory, and occupies the rooms used by the School Dental Clinic. The whole cost of the installation and upkeep has been borne by Sir Philip Sassoon. Started eight months ago the clinic has proved entirely successful. Thanks to the Folkestone Education Committee it is worked in conjunction with the School Clinic, and the Dentist and the rooms are known to the scholars, ex-scholars, and parents alike, and it is to this fact that the major portion of the success is undoubtedly due. To the ex-scholar the clinic should be especially attractive. Possessed of good teeth when leaving school he will be able to present himself at the clinic from time to time to have his mouth inspected, and this at no cost to himself, and should his teeth require treatment, he will be able to secure this at a nominal charge. It may be mentioned here, that competition with the private dental practitioner is not set up, as every care is taken that the financial position of the patients is such as to preclude them from paying the fees ordinarily charged by the profession. The small charges for the work done at the Clinic are made primarily to eliminate any suggestion of charitable aid, as it is expected that should the numbers at present attending be maintained or augmented, the Clinic will be self-supporting. The terrible state of the majority of the mouths seen at the adult clinic prove the urgent necessity for the initiation at once of a scheme for a National Dental Service. In the future a school Dental Clinic will be incomplete unless an adult clinic

is co-ordinated with it. The adult clinic will be self-supporting. Without an adult clinic, viewed from the point of view of the dental soundness of the adult four or five years after leaving school, the expenditure on School Clinics is largely wasted. The matter is of great importance to the country at large, and should any School Medical Officers or members of the Congress desire the details of the working of the scheme they will be given with great pleasure.

It has been estimated that there are over 20 millions of adults in this country who cannot afford the ordinary fees of a dentist. If this be so I am sure that over 19 millions of the adults of this country are being poisoned in a greater or lesser degree by pus-laden mouths. This awful state of things, being preventible, should not be. It is curable, and, with an adult clinic, preventible.

The Opportunities afforded by the Day Continuation Schools for the Extension of the Teaching of Hygiene, Child Welfare and the Laws of Health to our Young Workers.

By Miss L. WINIFRED ELLIS SCARLETT (Associate).

MANY persons interested in the education of the children of the working classes have deplored the fact that formal education has usually ceased just at the age when it became specially valuable and fruitful, namely at the dawn of the adolescent period.

This was felt to be specially unfortunate in the case of instruction in matters of Health and Hygiene. The children left school just at the age when they became really interested in the subject, and when sound instruction in matters of health became specially necessary.

We have now in the Day Continuation School scheme a most valuable opportunity of extending the education of our young workers and of giving them sound teaching in matters of health and hygiene at an age when they are able to benefit by it.

Science forms part of the Day Continuation School curriculum, and in the Camberwell Day Continuation School, the Principal has decided that a part of the science course shall deal with the science of health, and lessons are given daily in elementary physiology, personal and communal hygiene, and the laws of health.

The great value of such teaching, and the special need for it, will at once be apparent when we consider the fact that all the students in these schools are already, or will be, workers. Health is the worker's greatest

asset, and in the severe struggle of modern business life we know what a handicap is indifferent health.

Why the body needs fresh air, nourishing food, exercise, sufficient sleep and suitable recreation ; a knowledge of how to feed themselves to the best advantage according to their occupations and their earnings and of how to clothe themselves suitably, these are all things which every boy and girl should at least have the chance to learn.

Again, we know that many enthusiastic workers for the reform of unhealthy industrial conditions have found their efforts frustrated or their work rendered ineffective by the apathy of the workers themselves. This is often due to their ignorance of the reasons underlying health regulations, and of the evils which follow neglect of the laws of health.

A course of instruction spread over the two years of the Day Continuation School period, could quite well include simple but interesting lessons in elementary physiology, hygiene, food and dietetics, some instruction in child welfare and possibly in eugenics and lessons in sanitation.

Such a course of instruction carried out in the Day Continuation Schools would reach those who do not avail themselves of the opportunities afforded by the instruction in health subjects given in Evening Institutes. Also, in many cases an interest in the subject would be aroused which would lead to the work being followed up in the Evening Classes.

Would it not be possible to stimulate the interest of the teachers by arranging courses of lectures and visits similar to the excellent lectures arranged for Health Visitors and Child Welfare Workers by the Institute ?

Could an elementary examination, which could be taken by pupils of sixteen, be held and a Certificate of Merit granted to successful candidates ?

This work of instruction in health and hygiene carried out in the Day Continuation Schools might possibly become the means of a practical scheme of National Education in Health.

The following took part in the discussion on the papers by Dr. G. A. Auden, Dr. Harold Scurfield, Mr. F. Constant, and Miss L. W. Ellis Scarlett (see pages 131, 138, 143 and 147) ;—Dr. J. Whealey (Shropshire) : Dr. A. G. Wilkins (Stafford) : Dr. G. E. Oates (Bethnal Green) ; Miss Amy Hughes (London) ; Dr. J. J. Buchan (Bradford) ; Miss E. M. Thompson (London) ; Dr. C. Sanders (West Ham) ; Dr. J. M. Martin (Gloucester) ; Mr. T. E. Butler (Leeds) ; Dr. C. Kirkhope (Tottenham) ; Ald. J. H. Dobson (Tottenham).

SECTION D.—PERSONAL AND DOMESTIC HYGIENE.

Presidential Address by the Mayoress of Folkestone (Mrs. Reginald G. Wood).

IT is a very great pleasure to me to extend a hearty welcome to the members of this section who are met to consider the important subject of Personal and Domestic Hygiene. I appreciate the honour done me by being asked to preside over this section.

Having been a member of the Maternity and Child Welfare Sub-Committee of this Borough since its inception, I have had great opportunities of seeing the necessity of increased cleanliness, both of the person and the home. I can bear testimony of the good work already accomplished in this respect as a result of Health and School Nurse Visitors, and we have, in our local Welfare Centre several cases of very great improvement in the health of babies, but I regret to say that the right people do not use the facilities at their disposal, and we only get the very worst cases occasionally.

It was a pleasure on a recent Empire Day to see in the March Past the improved physique of the boys and girls compared with those of the past decade.

With regard to personal cleanliness, with the provision of cheap Public Baths and the provision of Baths in almost every house in all the new housing schemes, it ought not to be difficult to ensure that a clean body should provide the healthy mind, and yet we find in the poorer homes there is a great lack of personal cleanliness. This is, no doubt, due to the bringing up of the Mother ; how often we see the great contrast between the occupants of adjoining houses. In the one we see the Mother and Children scrupulously clean in their persons, and in the other the very opposite. Much is done, I know, in our schools to teach the girls of to-day housewifery, cooking and laundry, and this should have a beneficial effect and make better housewives for the future, but a great deal more might be done in our church agencies to bring obscure cases before the notice of Sanitary Authorities so that such cases might be visited and treated in the Cleansing Stations which all up-to-date authorities provide.

With regard to Domestic Hygiene, I am pleased this subject will be ably dealt with by those reading papers and members taking part in the discussions. It is not to my mind a scientific subject, but may be summed up in one word, " Cleanliness." That eminent Sanatarian, the late Sir Benjamin Ward Richardson, said that Sanitation in its widest, longest, deepest dimension could be summed up in that one word. He said : " if

by some magic spell England could wake up to-morrow clean, she would wake up pure in spirit and godly in the comprehension of godliness." In fact, we should set before our Mothers that splendid motto : " Let us do our work as well, both the unseen and the seen ; make the house where gods may dwell beautiful, entire and clean."

I hope you will all have a profitable session and that your visit to our town and district will be an enjoyable one.

Hygiene and Personal Efficiency.

By Miss G. M. Dawson Caves, Organising Teacher of Domestic Science, Cheltenham Education Committee.

(Abstract.)

Efficiency, Strength, Power.

TO acquire efficiency requires not only concentrated mental effort, but physical and moral strength. The great factor needful is health, and health is largely dependent upon hygienic conditions. The practical study of personal hygiene provides a sound basis to everyone who desires good health, and the results it brings in its train.

There are several essential principles required for the building up of personal efficiency or strength.

1. The formation of good habits of cleanliness, etc.
2. The necessity for plenty of pure air and refreshing sleep.
3. Temperance in all things, mentally, morally and physically.
4. A well balanced diet consisting of carefully planned and suitable meals.
5. Congenial surroundings with a well ordered plan of work, no matter what the station in life may be.
6. A bright and hopeful attitude towards work.
7. A moderate amount of recreation and exercise.

All these essentials are governed by obedience to the simple laws of health.

1. Too much stress cannot be laid upon the formation of good habits. As our life, to a large extent, is made up of mechanical habits, slowly but surely formed through the years from birth, it will be easily understood that one cannot instruct children too soon in the formation of habits. They play such an important part that our lives are to a certain extent governed by our actions, the result of habits.

During childhood when the mind is plastic and retentive, it is necessary to build up personal habits of cleanliness, and these cannot be too well grounded as they, in turn, lead to the making of moral habits, and the development of character.

2 Sleep and Rest. It is extremely difficult to make people realise the absolute necessity for plenty of fresh pure air, waking and sleeping. An alert mind requires both an abundance of pure air and a proper proportion of refreshing sleep. Well ventilated, airy rooms, with a minimum of furniture, pictures and ornaments, of a pleasing but non-elaborate type, are essential.

3. Intemperance of any kind is a menace to a healthy life, and, even if alcohol is only taken in moderation, a strong will is necessary. Besides the deteriorating effect on character and capacity, it prevents proper development of the intellectual faculties, weakens the power of the body to resist disease, and leads to a general lowering of moral tone. Indiscrimination in dress is another form of intemperance.

Discomfort in the home and lack of nourishing food are often the first steps to intemperance in drink, and this by causing irritability, discontent and strife, may lead to universal unrest.

4. Suitable nourishing food helps to build up a good physique, which is a great asset to personal efficiency. A well-nourished body means good mental capacity, and this combined with physical strength will carry one a long way in the work of enterprise in the world.

Mal-nutrition is not always through lack of food, but through indiscrimination in the choice and combination of the various food-stuffs.

The amount of food required varies with every individual, and is dependent on age, sex, climate, occupation, and so on. Regularity in meals, with variety ; sound teeth and good masticating powers, with proper time allowed, are essential to a good digestion upon which so much depends.

5. To those who have to work in the same place day after day the surroundings should be as restful, non-irritating, and hygienic as possible. Environment has a great influence (sometimes unconsciously) on both children and adults, pleasant, light and tastefully furnished rooms are a great aid to the development of refined taste and a love of the beautiful, and this is of great assistance in the cultivation of sound moral character.

Work of some kind is essential, if not for self-support then for social service. Even the baby needs employment of some kind to develop his intellectual and physical faculties. The school child requires a variety of work to instruct, exercise and enlarge his powers. The same with an adult. To keep up a good standard in any branch of work demands constant and

systematic practice to aid the intellectual strength. Mental and physical capabilities cannot be exercised without work of some kind, both are necessary. If one is needed for self-support then the other is required as a recreation and antidote to work.

6. Attitude towards work. Although it does not always follow that good health and cheerful spirit go hand in hand, health is a great factor towards happiness and an optimistic outlook on life.

All the foregoing principles mentioned go to form the general outlook but perhaps nothing so much as a congenial occupation, and for this reason it is essential that those in authority in any capacity, should themselves understand the underlying principles of health and endeavour to see that surroundings are as satisfactory as possible.

7. To broaden the outlook, and to keep the body and mind healthy, mental and physical exercise are of paramount importance. Both exercise and recreation should form a complete change from the ordinary routine. No two people require the same type of recreation and exercise—sports are good for the studious, good literature and mental work for the physically energetic. Change of occupation is necessary for all to aid physical and mental development.

Hygienic principles therefore form the fundamental basis of personal efficiency, or in other words, the basis of education is, and must be physical. "The purpose of life is to reduce wastage of life through errors, to give all round efficiency, valuable habits, and a command of methods for continuous living."

The next point for consideration is: How can these principles be driven home so that everyone has a chance of benefiting by them?

The ideal place for the foundation of all personal qualities and habits is the home, and it is the business of the home to develop in children such essentials that they enjoy overflowing health in childhood, form good hygienic habits, and lay the foundation for a good physical and mental constitution through life.

Unfortunately conditions are often far from ideal in the home, but not always through sheer ignorance. An idea that things in general are wrong, is often realised, but how to alter the conditions is not understood owing to lack of fundamental knowledge. The simple laws of health must be clearly grasped if the surroundings in the home are to improve.

This can be effected in two chief ways:—

I. By people with plenty of practical far-seeing common sense who have hygienic knowledge and the power to apply it, assisting by social service, and through their own personality and work, those who are floundering in seemingly hopeless confusion.

(*a*) Means of improving home conditions through *Adults* can be brought about by the establishment of Welfare Clubs for Men and Women, to widen their interests and to instruct them. Institutes where discussions, short lectures on interesting and practical topics appertaining to the home and to outside affairs.

(*b*) Suggestions for furnishing and adapting existing furniture, etc., to the various rooms in the houses.

(*c*) Simple methods of ventilation—with talks on the effects of impure air and so on.

(*d*) Well illustrated cookery lectures for men and women, with special reference to household aids, food values and accounts.

(*e*) Labour-saving devices where men can often give useful ideas which they can carry out by making articles to economise time and labour in the home—specimens to be shewn.

(*f*) Exhibitions of work in practical crafts will greatly encourage the men to take an interest in their home, and help to spur on the mother who may have got disheartened through lack of appreciation and the overwhelming amount of work the home always seems to entail.

(*g*) Educational films would be of much value. To most people the "pictures" appeal very strongly, and, along with the filming of a good book, various schemes for furnishing of homes, with contrasts; chubby, well nourished children doing various kinds of exercises, teeth drill, etc.; various types of girls and boys in sensible well constructed garments, etc., would both interest and instruct.

In villages where there is no cinema a magic lantern is just as effectual, if not more so, as explanations can be given.

(*h*) In every household a newspaper of some kind is taken in, and often has much influence, especially as many people pin their faith in knowledge gained from newspapers.

Libraries of wholesome books are another essential, these are usually patronised by children and adults.

Reforms of various kinds are urgently needed to help eradicate the unrest rampant, but much care and foresight is necessary before tackling any problem. Evils are not always best attacked direct and in a body, the wisest policy is often indirect, but none the less effectual.

II. Another, and perhaps better way in which home conditions can be materially assisted is through the *Children*, girls especially, but boys can do a great deal and benefit a vast amount by the practical work taught in the school. From the handicraft centre, his knowledge can be applied in the home by doing odd jobs, making and mending small articles, etc.

Parents must be taught to realise that to form habits of industry and

skill needs constant repetition, and this can only be done by allowing children to practise at home. The same with girls, every woman, married or single, at some time or other has to take charge of a household, if not her own, possibly the supervision of a relative or friend's, or it may be part of her livelihood.

Every girl needs instruction in domestic affairs, and with these is closely associated hygienic principles. Again, the best place to receive instruction is in the home, but is it given ?

As already pointed out, this is not always possible owing to prevailing conditions in the home. On the other hand, it must be remembered that the household routine each day takes place when a girl is at school, and only at odd moments, and when on holiday is she able to devote time to domestic affairs.

Practical domestic and hygienic instruction should have a place in the time table in every kind of school : elementary, secondary, continuation. Adequate time, too, is essential, it is impossible to carry out successfully practical instruction in the short time so often allotted.

If domestic management, including expenditure of income, planning and preparation of meals, food values, diets, simple laws of health and sanitation, mothercraft, making and adapting garments, was taught and thoroughly inculcated with practical application, to form habits, then personal efficiency would come which would benefit not only the individual but raise the whole tone of the community.

The following took part in the discussion on this paper :—Miss Amy Hughes (London) ; Miss L. Harvey (Folkestone) ; Miss C. Cochrane (St. Neots) ; Miss O'Riordan (Camberwell) ; Ald. J. N. Dobson (Tottenham) ; Dr. Colston Williams (Glamorgan) ; Mrs. M. Stewart (Darlington) ; Dr. Lamb (China) ; Councillor Mrs. Drapper (Deptford).

Health Teaching of the Mother and the Child.

By Miss Amy Hughes.

(Abstract.)

I WANT to state the question broadly and to bring home the necessity of considering the possibility of a wider education. Many present are naturally very interested in the Maternity and Infant Welfare Centres which are doing splendid work all over the country. In the work of these Centres the voluntary helper finds the greatest sphere of usefulness, both as initiator and in carrying on the routine work. The technical sides of the work are dealt with by the doctor and nurse ; these supply the basis of the educational work, and in their hands lie tremendous powers for the shaping of the future. They are experienced in all that pertains to the high science of health, and it is the responsibility of the Local Health Committee that these expert services are efficiently rendered and available for the public.

So many of the things which count in a baby's welfare are little things. The Centres are not Hospitals for the cure of acute diseases ; they are rather preventive Centres where the small defections from the path of normal health may be corrected, and above all, where the mother may seek knowledge whereby to make the best possible conditions for the new life which has come to her in what are, too often, far from ideal surroundings.

The free-minded mother is well informed, seeing the world that waits her baby with clear eyes, and may have a new and probably disconcerting point of view to bring to bear on social developments. The sooner the women of the nation study the many problems concerned the better will be the record.

One of the pressing questions of the day is the need of accommodation for the children and their parents. What chance have growing children to become strong and healthy when they sleep in crowded beds in small rooms and little or no ventilation ? Things are improving, but it is a revelation to many people that such conditions could exist, and we have to deal with those who underwent such experiences in their youth and realise that it needs patient tactful training to raise them to higher ideals.

Every mother, whether educated or an ordinary worker, should realise the absolute necessity of breast feeding her baby, and that it is only when there are special conditions which do not enable the mother to undertake this that any alternative arrangement should be made. In some cases it is not

possible, owing to ill-health, for a mother to breast-feed her child, but if she sought advice from her doctor (or at the Welfare Centre) often the trouble could be averted. When the child has to be bottle-fed it is essential that pure milk is obtained and also full information with regard to the amount for each meal and the treatment of the infant should the milk in any way affect its digestion.

Then it would appear very desirable that every class of mother should realise the danger of their children contracting infectious diseases. My personal experience as a district nurse has enabled me to realise that when there is an epidemic of measles every mother ought to know that the child who, apparently, is only suffering from a cold, should be put to bed and kept there until the rash appears. There is so much misunderstanding with regard to this, and it is because of this neglect in the early stages of the trouble, that so many children die of pneumonia and bronchial troubles.

So very few people realise that if children out-of-doors are given dummies to suck, how liable they are to contract infectious diseases. Also it is due to the constant sucking of the dummies that enlarged tonsils and adenoids are so common, and this means operations later on.

We also have to deal with the proper food supplied for growing children, and parents require to study this question carefully especially for the child who, having ceased to be breast, or bottle fed, is requiring more substantial food. The best method for obtaining good and helpful information would be for the well-educated woman to consult her doctor as naturally he, or she, would understand what is really necessary for the child. The working mothers would obtain first-class information at the Infant Welfare Centres and would be able to deal wisely with the many difficulties concerned.

Also the proper clothing of children, especially of the babies and little ones who are just learning to walk, is very necessary to their health. It means so much to infants to have their feet warm, and it would be advisable for every mother to arrange for her baby to have woollen socks to avoid chills. Also children who are beginning to walk need comfortable warm shoes and also woollen coverings for their legs. These points are being dealt with, however, very thoroughly and very successfully in the majority of Infant Welfare Centres, and the mothers who are able to have nurses do not meet with much difficulty in this question, but at the same time I would urge upon all that they do their best to ascertain practical information on these important points.

It is most important that mothers and fathers should realise the effect of venereal disease. Many children are victims of blindness and other forms of this disease ; if a special discharge gets into the eyes of a child at birth there

is little or no hope of saving its sight. If its effects were brought home to the future fathers and mothers of the nation of every class it would help to remove the scourge.

The following took part in the discussion on this paper :—Dr. C. S. Thompson (Hyde) ; Mrs. E. Fuller (Dover) ; Mr. T. E. Butler (Leeds) ; Miss O'Riordan (Camberwell) ; Dr. Bostock Hill (Bembridge) ; Lady Borrowes (Folkestone) ; Mr. W. Boissonade (Acton) ; Miss F. Ames (Folkestone).

Common-Sense Hygiene in the Home.

By ARTHUR F. WICKENDEN, A.M.Inst.C.E., A.R.I.B.A., P.A.S.I. (Member).

(ABSTRACT.)

ALTHOUGH the question of hygienic homes has been so much discussed for many years past, the practical results from the great attention rightly given to the subject are not so apparent in the average homes of the community as could be desired.

The lack of essential co-operation on the part of the masses may be partly attributed to the fact that hygienic subjects are too frequently placed before the public in such theoretical and idealistic forms that they appear impractical.

In this short paper a few suggestions are put forward relative to the construction and furnishing of common-place houses.

Giving first consideration to constructional matters, the question of floors calls for attention.

Many excellent types of jointless composition flooring are now available, which are to be strongly recommended in preference to the usual boarded floors. A room covered with jointless flooring, polished if desired, and furnished with rugs of various sizes, placed where required, so as to be easily taken up for shaking, can be made quite comfortable, and kept infinitely cleaner than one covered wholly or partially by one large carpet, which quickly becomes dust-laden, in spite of modern mechanical carpet-sweepers of varying degrees of efficiency.

The latest types of steel windows show a great advance over the old-fashioned timber casements, or sashes and frames, as regards the admission

of the maximum quantity of light, prevention of draughts and convenience of adjustment to allow adequate ventilation.

Efficient ventilation of the living rooms of ordinary houses, independently of window openings, is a matter to which more attention might well be given, and the provision of fresh air inlets and foul air extracts would add considerably to the comfort and health of the inmates of such houses.

The usual sanitary fittings in small houses very often leave much to be desired in matters of design, construction, quality and methods of fixing.

The treatment of wall surfaces is an important factor in the sanitary home. For decorative purposes the use of washable paint has much to recommend it in preference to wall-papers, and there appears to be no valid reason why picture rails should not be fixed considerably lower than customary, so as to be within easy reach for dusting and by allowing a deeper frieze, finished in white or light tints, to assist in the reflection of light.

From the points of view of economy and cleanliness it will probably be agreed that gas should be employed for cooking and heating, but more attention should be directed to the improvement of the hygienic properties of gas-cooking stoves.

In the furnishing of the majority of homes of the poorer and middle-classes traditional customs and habits are too frequently followed with a disregard of common-sense hygienic principles.

The reforms urged include the reduction of all furniture, curtains. floor coverings and ornaments to a minimum compatible with comfort and a pleasing appearance.

The use is suggested of well designed and strongly-made wooden furniture with detachable seat and back cushions in preference to the heavily upholstered productions, in the cheaper varieties of which sanitary construction is extremely problematical, while their presence in the house is certainly not conducive to cleanliness.

In conclusion it is claimed that the simple hygienic home, while promoting clean and healthy living, can be made perfectly comfortable, and is also a sound economic proposition.

The following took part in the discussion on this paper :—Dr. C. S. Thompson (Hyde) ; Miss L. Harvey (Folkestone) ; Ald. J. H. Dobson (Tottenham) ; Dr. T. W. N. Barlow (Wallasey) ; Mr. D. Pugh-Jones (Cardiff) ; Mr. Fletcher.

SECTION E.—INDUSTRIAL HYGIENE.

Presidential Address, by The Right Hon. Viscount Burnham, C.H.

I FEEL it a great honour to be called to the chair of so important and interesting a section of the Congress as that which deals with industrial hygiene. The public health is, of course, scientia scientiarum, the science and art of living itself. No branch seems to me to have a fuller promise of practical possibility than that with which we are now dealing. Comparatively speaking, it is a new name, and comparatively speaking it is a new thing. The truth is that in this country we pay, and pay in full measure, the penalty of our past greatness. There is no industrial country in which the difficulties are greater because, of course, ours was the first country to be industrialised. I use the word "industrial" and not "industrious" because I am not thinking of the primitive forms of industry which for thousands of years have been carried on in the same way in the greater part of the world. I am thinking of industrialism as it was introduced at the time of the industrial revolution, and has been developed since, under our own conditions of national life. What you have to deal with in advocating new methods, perhaps still more in inculcating a new spirit, is with settled habits of old established industry as well as with material facts which cannot be denied. One feels that when one has the opportunity of contrasting the advantages and the opportunities of a new land, such as the great Dominion of Canada, and comparing it with our own. Last year I spent nine weeks in the great Dominion, and I saw there the great industrial establishments which are being set up, especially in connection with my own trade—pulp and paper—and the enormous advantage you have in starting with a clean sheet and on new ground untrammelled by the legacies of the past so far as they are hindrances, and greatly advantaged by all the experience that has been gained in the last century and a half in our modern industrial system. Far be it from me to say that in America —and I use that as covering the United States and the Dominion of Canada—industrial conditions in the great cities are free from fault or are much better than our own, but where it has been possible to start towns afresh and build them up under good conditions, around the works and mills, that have been put up, then, of course, it is possible to do things with a spaciousness, a cultivation of communal health and an adaptation to social needs such as we find it almost impossible and beyond the power of the purse to achieve in the crowded and costly districts of our land. I

visited the great paper mills of Laurentide in the western part of the Province of Quebec, where, without regard to space, the corporation that owns it has been able to put up a model town and practically supply free light and heat to every house within it from the enormous water power which is at its command—200,000 horse power, of which only 20,000 are in use for the industry. That, of course, gives a scope and a potency for advancement which are forbidden to us here. Curiously enough, what obtains in America to so large an extent in the case of all those industrial towns which have been planned and constructed for a single purpose, applies very largely also to the German Empire. The cities of Germany—the old burgs—are as ancient, if not more ancient, than most of our own, but they were small and provincial, and, until lately, untouched by industrial development. Two years ago I had the honour of being the guest of the American Army in the occupied region under General Pershing, and when we reached Coblenz the American Ambassador, who was my companion, said, "This is almost as hideous as an American city." But, where as in Germany the industrial development has come late, town-planning has gone on just as if it were a new country, and the works and houses are laid out with a symmetry and regard for public health which, again, we find it extremely difficult in out tortuous streets and confined areas to accomplish. Take, for example, such a city as Nuremberg, where there is an old nucleus of a burg reaching far back into the dim past of European history. But the old burg of Nuremberg has nothing to do with the industrial city which has grown up around it. There in Germany, as in America, having the lesson of our experience to rely upon, it has been possible to plan works and residential areas with a symmetry and on a scale which makes all the problems of public health comparatively easy to deal with. On the other hand, if our industrial system is old—though certainly I do not hold it to be senile—we cannot get rid of our own responsibilities by blaming those who have gone before us. In the Victoria era, broadly speaking, it would have been considered an interference with Divine Providence, as well as with individual liberty, to have attempted what we are considering here to-day. The Manchester school of economists, men with the views, though not all with the eloquence, of John Bright, would have thought of this as molly-coddling the industrial population—what we should call in these days spoon-feeding. They would have said we were doing our best to undermine the self-reliance and self-help of the workpeople. It was not want of humanity, but difference of view, that caused them to take this line of policy. Men who would have looked upon welfare work as unjustifiable interference with individual development were not less humane than we are now. They started with a different conception of human character,

and they arrived at different conclusions. On the other hand, it is quite possible in these days we are going too far in the other direction, and certainly due safeguards are required to prevent national character being enervated and even emasculated by over much supervision and interference. In America welfare work, if it has been imposed by authority on the workers in the mills and factories of the country, is often resented as being what is called paternalism. For example, Pullman City, as you know, was the first of the model cities, the garden cities, to be erected on the other side in association with the great works which bear Pullman's name, and it was very unpopular with the workmen employed there. There was much talk of the "tyranny" of the corporation; of interference with individual taste and individual aptitude, even touching the side of temperance—the question of temperance which was there made compulsory—because there was local prohibition long before national prohibition was thought of. Paternalism, as it was called on the other side, has been deeply resented, and that brings me to the conclusion that in the welfare work that is done in connection with industrial hygiene here it is essential that we should have, not the spirit of paternalism, but the spirit of co-partnership. Unless there is a concordat between employers and employed, then it will be found that the great difficulty lies, not in the material facts, though they may be stubborn enough in our ancient buildings and in our crowded cities, but in the veiled hostility or, at best, the indifference of the working people to their own welfare. In every case it is essential that there should be a free and frank alliance not only in aim but in practice between the employers and the employed for the common good. Unless there is that co-operation of energy and goodwill, then I am afraid that on this side of social reform, as we still can call it, progress will be slow. The Great War advanced things a hundred years at one leap in many ways. In regard, of course, to social welfare and amelioration it taught us a great deal, and it has left behind us many examples of work well done as well as of a certain amount that has to be borne in mind rather as a warning than as a example. On the other hand, during the war there is no doubt that regulations were accepted and obeyed which it would be difficult to enforce in time of peace in the same way when the same question of public safety or public health is not involved under the same stress. It seems to me that we have a machinery now in existence, if not in all cases actually functioning, which is admirably suited to embody the spirit and perform the duties that are involved in these matters of industrial health and welfare. Of course, I mean the Whitley Councils. There are fifty or sixty of them in the great trades—the national councils—and there are, of course, too, a great many more in works and districts. My impression is that they are rather starving, as a

rule, for want of work, and if that condition of things continues, then they will become flabby and perfunctory and will lose the driving force which can alone enable them to work as they were intended to work—for the joint and several benefits of all those concerned. They were never meant to be arbitration boards to deal with wages alone. In some cases they fail conspicuously in the wage problem. They want fuel to consume, and it seems to me that it is through and by the Whitley Councils, both as national institutions and as local bodies in the various industrial establishments of the country, that these matters of industrial hygiene and social welfare can best be treated. You may make your mind up to this : that unless we have the active assistance of the working people engaged in all the great provinces of our national industry, no matter what be the code of your sanitary legislation, no matter what be the zeal of your medical officers of health, no matter how great be the sympathy and good intentions of the employers, whether they be corporations or individuals, you will effect nothing morally, and little in any sense to reach the purpose that we have in view. I speak with some knowledge of my own trade in particular. I am a printer and paper maker, as you may know. The printing trade had a bad name for one special class of disease called printer's phthisis (which is, of course, tuberculosis in different forms) by reason of the condition of work. Well, a good deal, of course, was due to what I have said before ; the antique methods of the old houses, and the fact that the workshops and machine rooms were mostly built in the central parts of our crowded cities, particularly, of course, of London, where space was paid for at a high rate by the cubic foot, and little could be done to give such amenities and such conditions as are possible where printing works have been moved, as has been so often the case in recent years, into country districts or the outer parts of country towns. If you were to wander with me into the old printing houses of London City—just within the City—the One Square Mile, or just outside it, you would find, as a rule, that the machine room and often the composing room, were underground, with poor ventilation—if you could call it ventilation—and so congested in their appliances that even the free movement of the employees was a matter of physical difficulty. Under the old methods of manual work great quantities of metal were handled in composing and stereotyping which gave rise to any quantity of what was called grit, that got into the lungs of the workmen and produced the disease for which our trade unfortunately is notorious as being the highest in percentage in the country. The grit got down the throats not only in simple form, but it was carried by the fluff of the paper, which almost acted as a cradle for its passage. And there was not only the grit but there was the dust. The whole of our industrial system is cumbered and in-

crusted with the dirt of a hundred and fifty years, and that was certainly true of the printing shops as much as of any other kind of industrial establishment. There were no mechanical or automatic cleaners, and the dust accumulated not only on the floor but in all those boxes, which are called "cases" in the composing world, and which were receptacles for all the filth of the composing room. Rags were always being used in the wrong place to prevent a passage of air and to dam up the filth in all the receptacles in the rooms. Particularly what was called the "quad box" was full of dirt, and was almost a breeding case for the particular disease from which the compositors have always suffered most; and then they had the unpleasant habit of taking snuff continually—which shows how far opinion has gone—and of emitting the natural sequence all over the printing works. You cannot conceive, therefore, of what is called the "soil" being better prepared for the germination and prevalence of disease. May I add that every sort of expectoration was the regular custom of the trade. It was not only in the composing room that you found the conditions were bad. To a certain extent they must always be dangerous. In the machine room, where you have rotary press work on a great scale—for newspaper work, perhaps, more than in the general printing works, where you have flat work as well—there is an enormous amount of fluff thrown off by the machines, and while things have improved in most ways, there is a greater danger of infection because we print from paper dry, whereas before it was wetted, and then, being used in increasing quantities, it is a potent danger in itself, acting as carrier for all the bacteria which may be active for the misery and destruction of man. I have put the worst side of the picture before you to describe things as they were, and, to some extent, as they are. There has, however, been a general improvement in the printing trade throughout the country in recent years. Many establishments have moved to better surroundings in country districts, and in the big towns most of them rebuilt on a better plan, and the ventilation and sanitation of the buildings are very different to what they were. Mechanical improvements, resisted at first by the men, such as the introduction of the linotype machine for setting type, have diminished, of course, the opportunities for the grit and crumble of the metal in movable type. So you have a better chance now for men engaged in the trade in regard to their work, and far better in regard to their recovery, if they are ailing, for there are sanatoria not only on a national system, but in connection with our trade which are of great and growing value for the cure of sickness and the re-establishment of normal health. So things look far better in regard to the printing trade than they did, but I want to point out to you that it will be of little value unless men come into the schemes which are being formulated in the trade in the spirit of cordial

co-operation. I believe there is every prospect of their doing so. At the great International Printing Congress in association with the exhibition this year, the Secretary of the labourers connected with the printing trade read out to those assembled two circulars of this society, one to the employers and one to the employed, in regard to the conditions of work. I need not go over the points, because they are familiar to those who are experts, but the point of it was that they wanted a proper system of ventilation and sanitation provided, as in most good works, for the use of the men —and they are being used now where they were not twenty-five years ago—and for the employer to keep the premises clean by mechanical means. And the men are urged to carry out their duties in a helpful spirit and help those in authority to make the system set up work efficiently. The employees were asked not only to take due precautions for themselves and their fellows, but to report cases of negligence and misconduct. Let us hope that that will be widely followed. Employers may do their best, but you can do nothing if you have not the willing and active co-operation, in the spirit of co-partnership, of those who are employed, in seeing that the rules are enforced and appliances are taken full advantage of. I believe all this is possible. I have only given the example of the printing trade as a case in point, showing the necessity of doing these things and showing how they can be done, and done well. There is no doubt that foulness in the conditions of work means foulness in the conditions of body and foulness in the attitude of mind, and it is a case of remedy one and you remedy all. Carlyle talked of the gospel of soap and water. That sounds a little crude in these days, because we are not only thinking of the physical but also thinking, of course, of the intellectual and moral sides of life. The truth is they are all interlocked and all interdependent, and there is no doubt that when you ameliorate the one you ameliorate the other, and if we reach perfection so far as we are able to advance, so far we are acting for the general good. But we must not be discouraged. Sometimes, I think, we repent too much for our past sins and underrate what we have done to make up for the omissions and commissions of bygone ages. The fact is that everything that is taking place now bids us be of good hope and cheer, because we are dealing with a branch of knowledge only developed and applied during the last fifty years. The results which have been attained already would have astounded those who were talking about it at that time. There was a man who talked for twenty years on this subject. Not himself a scientist, he was a friend of science, and in every respect a great and typical Englishman. Charles Kingsley was not only a great writer and great churchman, but he was also a social reformer of the first rank, and it is satisfactory to turn back to what he wrote of great cities—

I think it is nearly fifty years ago. He said : " A man shall spend his days between a foul alley, where he breathes sulphuretted hydrogen, a close workshop, where he breathes carbonic acid, and a close and foul bedroom, where he breathes both." And with this I shall make another quotation, because it shows we have covered in the last fifty years in these matters a hundred or two hundred years of performance. He looks back in an essay which he calls " The Air Brothers "—it is a suggestive and a pleasant title—and he conjures up the picture of the Roman Emperors after eighteen hundred years turning to those who ruled the Roman Empire in their place—extending over practically the whole of Western Europe—and asking them what they had done. And they turn from Hades, in which they are enduring the eternal torment for their iniquities, to the great leaders of life and industry in modern England, and they say : " And where are your public baths . . . Are you aware that in Rome itself millionaire after millionaire, emperor after emperor, from Menenius Agrippa and Nero, down to Diocletian and Constantine, built baths, and yet more baths ; and connected with them gymnasia for exercise, lecture-rooms, libraries and porticoes wherein the people might have shade and shelter and rest ? Not in vain did we call you, some 1,500 years ago, the barbarians of the North . . . . ' Sordidi ac Foetentes,' as we used to call you when you were fresh out of your bullock-waggons and cattle-pens. Dirt is the fertile cause of disease and drunkenness, misery and recklessness, and, therefore, of discontent and revolution, followed by a tyranny endured." So this was the advice of the emperors. " This at least," said Constantine, " I did not expect when I made Christianity the State religion of my Empire." These are striking words of a great writer, and I quote them because they would sound exaggerated and overwrought to-day. They were written fifty years ago. If things are so much better in fifty years, which include part of the Victorian epoch, we can hope that we shall advance quickly from strength to strength in these matters, and shall realise that efficiency means all round efficiency, not merely to the individual as a mechanical unit, but as a living soul. We are both realists and idealists here ; realists in our close grips of the facts of individual and communal life which you in your professional capacity come across every day, and idealists because we never forget that it is especially our duty and our privilege to do all that we can to raise the common standard of life and living—not always the same thing—and to make our practice conform more to the principles which it is our official duty to lay down and to enforce.

Some Effects of Environment on Efficiency and Safety (Based on the Work of the Industrial Fatigue Research Board).

By D. R. Wilson, M.A., Secretary to the Industrial Fatigue Research Board.

AMONGST the requirements of modern industrialism, few are more important than a proper knowledge of the scientific principles governing human effort in work, and none has been more neglected in the past. The lack of such knowledge was clearly seen during the long parliamentary battles that were fought throughout the nineteenth century over every legislative proposal for limiting the hours of work, when no information based on actual experiment was available to confirm or refute the widely divergent views expressed as to the possible consequences to industry. Indeed, apart from a few sporadic instances of experiment on the part of far-seeing employers,* no attempt was made to explore the relation between physiological well-being and work until a very few years ago.

The importance of the study of the human factor in industry was first realised in America, and to Taylor, Gilbreth and others belong the credit of having raised this study to the level of a definite science. In this country, apart from some investigations carried out for the Home Office by Stanley Kent,† almost complete ignorance prevailed until well on into the war; it was, in fact, tacitly assumed that the human organism, like a machine, would respond to almost any demands made upon it, so that increased hours of work would bring about a proportionate increase in output.

The fallacy of this conception was conclusively proved by Vernon in 1916, in an investigation carried out for the Health of Munition Workers' Committee,‡ when he showed that in many operations production actually improved when the very long hours then being worked were reduced, the hourly output increasing so much as more than to compensate for the shorter periods of employment. The same Committee carried out several other investigations into the fatigue and efficiency of munition workers, and these constitute the first attempt in this country to deal with the subject on an extensive scale.

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* *E.g.*, Mather, Wm., "The Forty-Eight Hour Week," Manchester, 1894.

† Kent, Stanley, "Industrial Fatigue by Physiological Methods" (Interim Report) (Cd. 8,056), 1915. (Second Interim Report) (Cd. 8,335), 1916.

‡ Health of Munition Workers' Committee, Memoranda Nos. 12 and 18. (Cd. 8,344 and 8,628), 1916 and 1917.

On the disbandment of this Committee in 1917, the Industrial Fatigue Research Board was appointed by the Medical Research Council and the Department of Scientific and Industrial Research jointly to continue this side of the work and to take over certain outstanding investigations which were being temporarily controlled by the Welfare and Health Section of the Ministry of Munitions. Since July, 1918, the Board has conducted many investigations with a staff of about 20 investigators; twelve reports on different subjects have already been published, and four others are now under consideration.

The terms of reference to the Board were as follows: —

"To consider and investigate the relations of the hours of labour and of other conditions of employment, including methods of work, to the production of fatigue, having regard both to industrial efficiency and to the preservation of health among the workers."

On analysis it will be seen that they specify three causal factors (viz., hours of labour, other conditions of employment, and methods of work), and two effects (viz., industrial efficiency, and the preservation of health amongst the workers), each cause and effect being related through the common factor of fatigue. The reference, therefore, was a very wide one, but the present paper is confined to a short description of the results obtained up to now from the study of the second of these causal factors, viz., *conditions of employment* apart from hours of work, as being perhaps the particular side of the Board's work of more especial interest to the Conference. This description, however, includes only part of the task on which the Board is engaged, and definite and important results have already been obtained in respect of the other causal factors mentioned.

Factors in Environment.—The pathological aspect of the workers' conditions of employment, in other words their relation to health, has for many years been the subject of inquiry, particularly by H.M. Medical Inspectors of Factories, but so far as can be ascertained no systematic investigation has ever hitherto been undertaken into their physiological and psychological effects. Yet the latter, concerning as they do the normal man, have a special importance due to their universality, and careful research must eventually result in the discovery of principles having a direct and important practical bearing on the efficiency and well-being of the work.

The actual factors in environments are perhaps more numerous than might at first be imagined. The following for instance have all been considered by the Board at different times :—

Temperature, humidity, ventilation, lighting, noise, vibration, and dust.

The present paper is confined to the first four of these, for the reason that the Board's work has not yet progressed far enough to enable anything definite to be said about the remainder.

Methods of Investigation.—The main test of the effects on the worker of his environment has been his performance as measured by rate of output. At first sight this might perhaps be regarded as a test of universal application, but there are two important limitations to its use :—

(*a*) Output depends on the machine as well as the man, in fact the part played by the human factor may vary from 100 per cent. (in completely manual processes) to almost 0 per cent. (in completely automatic processes).* In practice, allowance can sometimes be made for this, but the sensitiveness of the test obviously diminishes as the mechanical factor preponderates, until the point is reached when the margin left is too small to be informative. For this reason variations in output can only be adopted for certain purposes, a subjective test being required for others.

(*b*) Variations in output can be caused by other conditions than the one under consideration. For the proper study therefore of any one condition (*e.g.*, temperature), it is necessary that all others (*e.g.*, hours of work, nature of product, conditions of manufacture) should be kept constant. In practice this is generally impossible to achieve on anything like a large scale, and as an alternative recourse has often to be had to calculation intended to correct the effects of the conditions that cannot be controlled. If neither of these methods can be adopted, output is obviously unreliable as a measure of any one of the conditions.

Another "effect" of environment, referred to in the present paper, is accident incidence. Whether accident incidence is related primarily to speeding up in production, to fatigue, or to the psychical condition of the worker is still a matter of controversy, but even without this knowledge it is of interest to discover the conditions of employment which in practice tend to produce the maximum or minimum incidence.

Effects of Environment on Output.

1. *Temperature.*—Vernon has shown that in heavy work, involving exposure to high temperatures, production undergoes a consistent seasonal variation, being with very few exceptions greater in winter than in summer.†

* Cf. Industrial Fatigue Research Board Report No. 7.

† Industrial Fatigue Research Board Report No. 5.

The particular processes studied were rolling in tinplate manufacture, charging of blast-furnaces, steel-smelting (open hearth and Bessemer processes), steel ingot rolling and puddling. On comparing the output records for December to March (Winter) and for June to September (Summer) over a long period, it was found that out of 26 factories, percentage reductions of 13·6 to 1·5 occurred in summer in 21 cases whilst small increases (4·0 to 0·2 per cent., due generally to technical considerations) occurred in 5 only.

More definite results as to the effects of temperature were obtained by Vernon in tinplate rolling mills,* by grouping together all the weekly output data in each factory according to the mean weekly outside temperatures as recorded at the local meteorological station. The results are given in the following table :—

Factory.	Total weeks Investigated.	Mean External Temperature during Week.						
		Under 40°	40° to 44·9°	45° to 49·9°	50° to 54·9°	55° to 59·9°	60° to 64·9°	65° and over.
A ...	115	102·1	102·3	100·0	99·6	98·9	98·1	94·0
B ...	332	104·8	103·3	100·8	98·9	98·1	96·7	93·7
C ...	193	100·3	103·9	103·5	100·5	99·1	93·4	95·5
D ...	203	105·3	105·2	102·3	99·9	98·6	96·8	94·0
E ...	55	110·0	105·7	102·3	102·2	99·6	94·4	90·0
Total weeks at each temperature ...		78	167	200	122	184	130	17

from which the dependence of output on temperature is clearly seen. Vernon points out, however, that the weekly output variations by no means fully express the full effect of temperature, since in each week the variations of temperature from day to day and from shift to shift are considerable and must have a corresponding effect on the output at the moment.

An opposite effect (viz., increase in output with temperature) is suggested by observations made in Silk Weaving by Elton,† who plotted the average hourly rates of output in a silk weaving mill against the average temperatures for each half day for 12 weeks. The results are not conclusive, but they suggest that between 58° and 65° Fahr. output tends to increase with temperatures. It should be observed, however :—

(1) That as the investigation was made during the winter the temperatures are low and do not approach those studied by Vernon.

* Industrial Fatigue Research Board Report No. 1.

† Industrial Fatigue Research Board Report No. 9.

(2) That the temperature of the air probably has a physical effect on the weaving itself, a moderate rise being beneficial.

Humidity.—Some relationship between air humidity and output is stated by Vernon* to exist in the case of the rolling process in tinplate manufacture. He found, for instance, in one factory that during 60 weeks with a mean temperature of 60° or more, the mean output fell by about 3 per cent. when the relative humidity of the air was above 80 per cent. A similar but smaller effect was found to exist for two factories during weeks when the mean temperature was 55° or more, though in another factory no relation between humidity and output could be traced.

The study of air humidity in relation to output is often complicated by the fact that the technique of a given process is affected by the humidity of the air at the time. An instance of this is to be found in the report on silk weaving, in which Elton states that he was unable to discover any relation between humidity and efficiency owing to the disturbing effects of variations on the different classes of textile yarns (silk, cotton, wool and viscose) used in the material produced.†

Another case of a rather similar type occurred in connection with the seasonal variations in output observed in blast-furnaces referred to above,‡ and illustrates the necessity in estimating fatigue effects of ensuring that other conditions are either constant or allowed for. A marked reduction in the rate of charging blast-furnaces, for instance, was observed during the summer months, but before this can be ascribed to lowered efficiency, any differences on the technical side occurring in the summer must be compensated for. All air contains moisture, which in its passage through the furnace is decomposed with the absorption of heat. Now the amount of moisture in the air and therefore the heat absorbed for a given volume is greater in summer than in winter, with the consequence that the productive efficiency of *the plant* is somewhat lowered. Vernon investigated this point in the case of two furnaces over 5 and 3 years respectively, and found that on the average the output was 1·5 per cent. greater in winter than in summer. He concludes, therefore, that even supposing that the whole of the observed seasonal variations of output were due to this course, it cannot account for more than a small fraction of the much greater seasonal variations observed in the rates of charging.

Ventilation.—In considering the effect of ventilation on fatigue and output, care must be taken to define the particular aspect concerned. The

* Industrial Fatigue Research Board Report No. 1.

† Ibid Report No. 9, page 40.

‡ Industrial Fatigue Research Board Report No. 5.

change of air in the environment (if we may so define ventilation) may obviously be regarded from different points of view in respect of its effects on the workers. Pathologically, it may be considered as a vehicle for the removal of dust or of the germs of infection, physiologically as a stimulus to muscular activity, and psychologically as a means of reproducing to some extent the invigorating conditions of outside air. The work hitherto carried out by the Board is concerned with the second of these effects, and in particular the cooling power of moving air.

Some striking results in this respect were obtained by Vernon in the tinplate industry.* Some of the rolling mills were provided with artificial means of ventilation such as puddles or air douchers, whilst others simply depended upon natural means. The difference in the seasonal variations in output (see above) between the two kinds of mill is clearly shown in the following table :—

Factory.	State of Artificial Ventilation.	Mean Output in :—		% Reduction in Summer.
		December and January.	July and August.	
A ...	Good.	100·5	97·5	3·0
B ...	Moderately good.	102·5	97·0	6·4
C ...	Moderate (or none).	105·5	94·5	10·4
D ...	None (good natural).	104·5	93·0	11·0
E ...	None (poor natural).	108·0	93·5	13·4

The effect of the good ventilation is clearly shown in the evenness of output in Factories A and B compared with Factories D and E.

The extent to which atmospheric conditions vary in their physiological effects has been explored by Hambly and Bedford by means of the kata-thermometer in a large number of boot factories.† The kata-thermometer, an instrument designed by Leonard Hill‡, consists of a large bulbed thermometer so constructed as to enable the time taken for the column to fall from 100° F. to 95° F. (*i.e.*, through a range approximating to the temperature of the body) to be measured when exposed to air at a lower temperature than itself. When the bulk is uncovered, the instrument is known as the dry kata and when covered with thin fabric moistened with water as the wet kata. The dry kata measures the cooling power of the air due to convection and radiation, and the wet kata due to convection, radiation and evaporation. By suitable conversion factors the rate of cooling of the bulb

* Industrial Fatigue Research Board Report No. 1.
† Industrial Fatigue Research Board Report No. 11.
‡ The Science of Ventilation and of Open Air Treatment (Medical Research Council Report No. 32.)

can be expressed in terms of millicalories per square centimetre of surface irrespective of the particular instrument used.

Hill has suggested definite numerical standards indicating air conditions suitable for different types of work (sedentary, heavy, very heavy), and in proper hands the instrument can be used to give very valuable information as to the physiological aspect of ventilation. It might, for instance, be used to test the adequacy of methods adopted in tinplate rolling, mentioned above.

The report by Hambly and Bedford deals solely with the kata-thermometric data collected, and the correlation of the conditions observed with fatigue and efficiency is not yet complete.

Lighting.—Elton has studied the effect of lighting on production in the case of silk-weaving,* which is a fine process peculiarly susceptible to variations in illumination. The investigation was based on hourly output data, recorded automatically on a large number of looms in two weaving sheds over a period of three months. By treating these data in various ways the relation of lighting to output could be clearly traced. The following table, for instance, shows the distribution of output (corrected for certain variables) from 56 looms during the week ended December 20th, 1919.

Period (a.m.).	Output.	Period (p.m.).	Output.
7.30—8.30	45·8	1—2	47·5
8.30—9.45	49·3	2—3.15	52·1
9.45—11	52·1	3,15—4.5	50·9
11—12	48·3	4.15—5.15	41·9

The use of artificial light was confined to the first and last periods, and to this must be attributed in great part the heavy drop in output observed, since at a later season when artificial light was no longer used, the reduction in output at the beginning and end of the period of employment, though still present, was much less marked.

Elton concludes that under artificial illumination, production falls, even if electric light of sufficient intensity is provided. The magnitude of this fall is of the order of 10 per cent. of the daylight value of the rate of output.

Effects of Environment on Accident Incidence.

The relation between accident incidence and human efficiency will probably be generally admitted. The incurring of any accident involves lessened capacity, even though it may be so trivial as not to cause absence

* Industrial Fatigue Research Board Report No. 9.

from work. The requirements in the Factory Acts are framed, generally speaking, to prevent the more terrible consequences of serious accident, but the slighter and more numerous kind can probably be reduced in number by investigating the conditions of employment which tend to produce them.

In an early Report issued by the Board,* Greenwood and Woods adduced evidence tending to show that accident incidence is not a matter of chance, but depends on some quality inherent in the personality of the victim. The further study of this important question belongs to another sphere of the Board's work, and the present paper deals only with relation of conditions of employment and accident incidence.

Temperature.—Some important light on the connection between temperature and the number of small accidents (cuts) experienced at munition factories is afforded in a report by Osborne and Vernon not yet published. The data show that there is a well-defined optimum temperature (namely (67·5 Fahr.), at which such accidents are at a minimum, and that as the temperature rises above or falls below this minimum the accident frequency increases almost symmetrically.

Lighting.—Several years before the constitution of the Board, an investigation on the relation between lighting and accident incidence, based on the returns of accidents to the Factory Department of the Home Office during 14 months (73,387 in all), was carried out by Wilson and Paterson for the Departmental Committee on Factory Lighting.†

By the use of certain assumptions, they calculated the accident rate per hour during daylight and during artificial light. The results may be summarised as follows :—

Cause of Accident.	Daylight Accident Rate Per Hour.	Artificial Light Accident Rate Per Hour.	Percentage Difference.
Machinery (moved by power)	16·62	19·64	18
Molten Metal	2·58	2·96	15
Struck by falling bodies ...	9·43	12·46	32
Persons falling	7·16	12·32	71
All Causes	61·27	79·19	29

The conclusions, therefore, to be drawn were that the number of accidents (of the kind reportable to H.M. Inspectors of Factories) increased by 29 per

* Industrial Fatigue Research Board Report No. 4.

† First Report of the Departmental Committee on Factory Lighting, Vol. I. (Cd. 8,000), 1915.

cent. during artificial light as compared with daylight, and that this increase rose to 71 per cent. in the case of accidents due to persons falling, a cause presumably specially affected by lighting conditions.

As a check against these results, the number of fatal accidents in mines (non-fatal accidents were not available) in which work is carried on wholly in artificial lighting were investigated. Only the "surface" accidents (involving work in daylight and artificial light) showed a heavy increase during the winter months, the "underground" accidents showing a slight decrease during the winter. The deductions drawn from the main investigation appear, therefore, to be justified.

Conclusion.—The chief value of the class of investigation described in this paper lies less in actual discovery than in enabling definite numerical values to be attached to the effects observed, the occurrence of which is indeed often already well-known.

If by these means proof can be adduced that a serious reduction in output results from causes remediable without much difficulty (as in the case of the tinplate rolling mills), the employer and workman surely have a common object in bringing about the necessary improvement.

But these investigations have an additional and more far-reaching aim, in that they constitute the principal means of studying first principles relating to the optimum conditions of work for the operatives of the future. The average workman spends about one quarter of his adult life in the factory, and his environment there is almost as important as any other condition of his living.

Organisation of Welfare Schemes.

By Robert R. Hyde, Director of the Industrial Welfare Society.

DURING the last five years a great deal of attention has been given, on the part of those who are interested in industrial developments, to a movement which is now generally known as industrial welfare.

"Welfare" is fast becoming recognised as descriptive of certain well-defined functions, and it is, I think, destined to remain a permanent factor in industrial administration. What is this movement, and whence its origin?

Shortly after the outbreak of war, owing to the inrush of workers into controlled and national factories, the Ministry of Munitions realised that urgent steps were required to be taken to ensure that all matters closely related to the health of the workers, should be carefully considered; therefore a department was set up within the Ministry to deal with the health and welfare of munition workers. Towards the end of the war it was thought desirable by a number of employers and labour representatives that the work thus begun should be continued in the days of peace. They were of opinion that the development of the welfare movement should depend for its guidance and control, not upon the State, but upon industry itself. State enactments too often suffer from the fact that they embody minimum demands, and are, to a great extent, negative in character, and at times obscure, inadequate and futile. They felt that united action on the part of employers and workers with the co-operation of the State was needed before fundamental improvements could be achieved in all those matters relating to the welfare of the worker. They wished to make an attempt to establish industrial self-control and to improve conditions and methods by moral suasion and education. Therefore the Industrial Welfare Society was founded, and during the two-and-a-half years of its existence very wide developments have taken place in the spread of the welfare movement, not only in this country, but throughout the world. It is being recognised more and more, even by firms who were, at first, inclined to be hostile to movements of this kind, that there is need for some central organisation where experiences can be pooled and information acquired and disseminated regarding the many phases of welfare work.

At the present time, since the information does not anywhere exist, it is impossible to state the exact number of firms, or the exact number of workers involved in definite schemes of welfare work. There are, however, to my knowledge, about a thousand firms where welfare supervisors have been appointed to the definite task of supervising welfare activities, but in a very

large number of firms, welfare work—in one form or another—is being carried out, either by means of *ad hoc* committees, or in some of the smaller firms this particular side of works administration has been entrusted to one of the directors.

In different forms, and dealing with a variety of activities, since welfare and health are matters, not only of the body, but also of the mind, welfare departments or committees are extremely numerous. Many of the industrial ills of the present day are due, not to a condition of bodily health, but to some mental trouble, which in the past has been regarded as of too slight importance to merit attention. This, however, has not been due, as some would suggest, either to the hard-heartedness of the employer or to the indifference of the worker, but to an unsatisfactory system which has been growing up during the last hundred years, the symptoms of which have at last thrust themselves on the attention of thinking men.

The welfare worker first makes contact with the employee when he or she applies for a job. The nature of the work is explained to the applicant and, after a brief interview—if the supervisor is up to his task—he will be able to judge whether or no it is worth while submitting the applicant to the foreman for selection on technical grounds. Questions of health, transport, residence, the availability of decent lodgings, are all questions which enter into this preliminary interview, and thus the weeding out of unsuitable applicants prevents many evils which in the past resulted from the placing of square pegs in round holes.

In many firms to-day the final selection of an employee is made on condition that he passes a medical examination conducted by the medical officer attached to the firm. The supervisor keeps a record of this examination, and where recommendations are made by the doctor sees that such recommendations are duly carried out. He explains to the new worker the rules of employment, gives him information regarding the social activities and athletic societies connected with the organisation, and explains the method by which meals may be secured at the firm's canteen. In the case of juveniles the supervisor would keep records of progress, so that when promotions or transfers have to be made, they may be made by merit and not by favoritism, a cause of resentment, and rightly so, in the days of the past.

Having, as it were, introduced the worker to the firm and made him feel that interest is being taken in his well-being, it is the supervisor's task to see that the conditions under which the worker labours are kept up to a high standard of decency and efficiency. It frequently happens that shops are cold, and very often this condition is not known to the head of the firm, who is not called upon to work for hours at a stretch at the bench or lathe. From time to time he may wander through his shop, and he retains within him the

warmth acquired in his own office, but even so, walking through the shop is not to be compared to standing or sitting in the same position for some lengthy period of time.

The installation of lighting suitable to the operation to be performed is a matter of the very highest importance ; but too often is allowed to be overlooked as altogether unworthy of attention. If one could compute the amount it would be interesting to know exactly how much money is wasted in industry as a direct result of dirty windows. Yet again this subject has not been tackled except in the case of a very few of the most efficient firms. In what is, perhaps, the most up-to-date establishment in this country to-day, windows are cleaned frequently by a regular staff, and the sweeping of the floors, twice daily, is regarded as one of the fundamental activities of the organisation. In connection with this latter habit, it is interesting to note that the firm argue that the time lost by workers in shops ill-lighted and with floors strewn with litter, in searching for small parts which they have dropped is more than compensated for by the employment of regular cleaners and sweepers.

Attention to ventilation, the elimination of draughts and the right circulation of air are matters which require personal supervision, if the health of the worker is to be protected. The provision and maintenance in proper order of cloak rooms falls to the welfare department of a firm. Too often wet and verminous clothing is jumbled up together, not only to the detriment of the worker's health, but to a lowering in standard of that sense of self-respect which should be maintained at all cost. Therefore, lockers should be provided for clothing, or where space is not available, except at prohibitive cost, racks should be provided on which clothing can be hung during working hours and suspended by means of ropes and pulleys in the warmer air out of reach of machinery, trolleys, and grease.

The provision of overalls, clogs, protective caps and so on are matters which, though apparently small, involve much thought in detail, if their use is to be made acceptable to the workers. The fencing of machinery, the education of the workers in " Safety First " all come within the range of this personal service department, and if no higher motive than self-protection leads to the development of this work, it is bound to come about. The provision and maintenance of sanitary equipment in decent order is a subject which calls for no great comment, but deplorable conditions still prevail in many factories which are a disgrace to modern industry.

One of the most important developments of the welfare movement during the last five years has been in connection with firms' canteens. The old method of eating food amid the dust and dirt of industrial occupations was good neither for the health of the workers nor for the efficiency of the plant.

In many cases opposition was offered by the workers to canteens when the subject was first mooted, but I know of no case where a well-managed canteen has failed to secure and retain the support and approbation of those concerned, In congested areas very great difficulties exist in regard to accommodation, and until there is a greater exodus from such areas and modern works are built in open spaces, there seems to be little possibility of any universal provision for the supply and service of mid-day meals. In spite of the difficulties, however, many firms have succeeded in converting corridors, odd rooms and army huts into very serviceable canteens, but in many cases, even where the firms have been willing, it has been found quite impossible to make adequate provision.

But not only in connection with the inside of the works is a welfare department concerned. The leisure of the worker, according to the use made of it, makes or mars his workmanship. Therefore, firms are coming to realise, where local facilities do not exist or where they are inadequate, that provision must be made for the recreation of their workers. There are to-day many hundreds of institutes, sports grounds, athletic and social societies connected with industrial concerns, and it has been proved beyond dispute that if workers are enabled to meet each other in social intercourse outside the working hours, a much better tone is produced within the place of work. Moreover, recreational activities provide a common ground where the members of the working community may meet together in common purpose, and the old snobbishness which rendered meetings between the office staff and manual workers impossible, is fast being lost in fellowship and understanding. The physical gain which follows is too obvious to require elaboration.

The provision of allotments, the organisation of a summer camp, the provision of means whereby holidays may be secured, are again matters to be dealt with by the welfare worker or committee.

The movement in this country is still young, therefore the exact place of the welfare worker in the industrial economy has not yet been definitely fixed. The welfare worker is winning his spurs to-day, and his or her future place in industry will depend very largely upon the success or otherwise of those who are pioneers in the movement. In some firms the welfare department is regarded as a branch of the employment or labour department; in other firms, where the workers number thousands, the whole thing may be split up into three separate departments, employment, medical, social. In many firms the whole of the welfare activities are conducted by various committees or by a works committee with several branches. There is a tendency on the part of industries where the units are small, *e.g.*, the printing trade, for the Masters' Federations or the Joint Industrial Councils to accept the responsibility for the development of their welfare work.

The whole movement is still in its infancy, but already there are signs that within the next few years very wide developments will take place. In spite of the state of industry prevailing at present I find a ready willingness on the part of employers and labour representatives to receive guidance and information regarding welfare matters.

In the past so much time has been devoted to the care of the material machine that the importance of the human factor has almost been forgotten. In the future the care of the worker must be the first consideration of every right-minded employer. He will be forced to realise, by sheer economic circumstance, that the first qualification of management must be the ability to handle human kind. He will be forced to realise, too, that conditions in the factory must compare favourably with the conditions prevailing in the best homes, and in the best schools from which his juvenile workers are drawn. To secure and maintain a high standard of health in his workers and in the conditions of the workshop must be his first endeavour, and since the welfare movement is attempting to bring about a realisation of this fact, I feel sure that this Congress will approve the work of which I have given this brief outline. Had you not already adopted the motto we might well have engraved upon the portal of the Industrial Welfare Society, *SALUS GENERIS HUMANI*.

Welfare—A Path to Industrial Peace.

By E. Holden (Associate).

THE true aim of Welfare is psychological, sociological, and even spiritual, because it observes as a fundamental basis of "work," the need for goodwill, and a recognition of the spiritual needs of man. A new standard of values must be adopted in the economic world which will give full recognition of the fact that each individual is knit indissolubly into the social whole. Labour must no longer be classed and dealt with in the economic scale as being in the same plane as "nature's gifts," capital, enterprise, or mechanical organisation, but as "man" must be considered on a higher plane, than that of his mere function.

Welfare work is not new, but is, indeed, quite as old as industry. We have it on record that certain firms have for many generations recognised the principles enunciated in the foregoing paragraph. Unfortunately, we know of too many of the opposite type who have been absolutely indifferent, and have, in consequence, had to be forced by the legal enactments and orders of State.

It is gratifying to record that certain firms, whose names are household words, and whose products enjoy a high standard of excellence, so high, indeed, that they have frequently been given the highest award of merit this Institute can confer, have always encouraged a true spirit of welfare, co-operation and comradeship with their workers. These pioneers have blazed the trail, and have plainly shown that modern industry can have the de-humanising elements considerably lessened if not eliminated, and this without philanthropy.

Under the new conditions in industry it is often necessary to create a new functional manager who shall be charged with the duties of establishing a human interest in the whole of the workers, and in their working conditions. This officer can show to the employer some of the progressive and helpful changes that may be adopted with justice to the needs and comforts, and, therefore, the efficiency, of the worker. He must, above all else, have a high moral standard, and must in all cases observe the position taken up by Aristotle, when he wrote, " Both parties being my friends, it is a sacred duty to honour truth first," and last.

Unfortunately, our country suffers from a widespread disbelief in education ; yet the shortening of hours of work in all trades will not be an unmixed blessing unless the worker realizes the right use of the leisure hours, by widening his general interests and knowledge, which will prevent him finding his ordinary work uncongenial, settling into a rut, and grousing at fate. Even our employers are liable to become enmeshed into the intricacies of the economic machinery, and, in consequence, look upon all contributing factors in industry as material things, so that there is generally much more care bestowed upon the purchase, installation and working of a new machine, than there is upon the installation of the human element. Yet the capital expenditure may be as high for one as for the other, independent of the fact that the human element brings a soul into industry.

The panacea for the removal of discontent is the full life. This can only be attained by an educated experience, and all real welfare schemes provide and assist in the organisation and promotion of all forms of continued and adult education, as well as the provision of the usual forms of recreational and social activities. Constitutional evolution has brought about political progress, and one does not need to be credited with prophecy when stating that the worker desires a similar progressive movement in industry. The Whitley Councils and Works Committees afford the worker opportunities which he will be foolish to ignore.

By making the fullest use of these privileges and opportunities the worker will acquire in the near future greater qualifications for the control of his specific industry than many who now constitute the boards of management,

and he will, therefore, have the right to become a consultant on a plane of equality just as he now enjoys the privilege in the social and political world. The present industrial crisis has given us the opportunity of seeing the best and the worst, in that many firms who have enjoyed the confidence of their workers have received loyal assistance and co-operation, and a promise to continue until the arrival of brighter times. Such actions are in striking contrast to the obsolete method of stubborn strikes. We are intensely conservative as a people, but the late war has forced us to analyse many of our old tenets, so that we are inclined to accept new constructive thoughts and ideals a little more freely. Now welfare work is of slow growth, because the worker has had experiences which have left behind bitter prejudices and haunting traditions, which are too well known to need enumeration in detail.

Welfare work is concerned with the scientific organisation of the factory and workshop, and is specially interested in the improvement of the conditions of employment, as well as the efficient training and improvement of the worker. The capable welfare worker makes himself intimate with the trading and manufacturing operations of his firm, as he is generally charged with the selection and engagement of the operatives. Here he has full opportunity of putting into operation the practical teachings of psychologists, so as to lessen the enormous wastage of our nation's youth through lack of guidance and help in the choice of trade or occupation. The day is past when the contract of service in a firm's employ should be so undignified as to allow a young person to enter upon work with the assumption that, "if he doesn't suit, we can give him the sack." The cost of labour turnover in many industries in this country is entirely overlooked, and, as previously stated, is not considered worth while to trouble about, although the expenditure of the smallest amount of money on the purchase of a new machine would call forth a vast amount of expert technical skill.

The scheme of welfare work must naturally act with special regard to the boy entering industry, and will be closely concerned with his training and development, and it is safe to assume that on his reaching manhood he will continue his service towards making industry the handmaid of man instead of, what has been the case in the past, man the handmaid of industry.

The method of training in most of our modern workshops is very inefficient and wasteful of the impressionable years of youth, and requires a complete technical overhaul and systematisation with a view to rendering the training complete. This matter will have to be taken in hand quickly if the child of the worker has to enjoy the privileges of secondary education. He will have to be taken into industry at a later age than at present, and the learning period shortened accordingly, and this can be done if a proper scheme of training is put into operation, thus giving benefits mutual to all

parties. Fundamental principles technically taught will allow for the quicker fulfilment of the young worker's visions, and, in consequence, we shall have less repression of youthful energy, with an increased enthusiasm due to the constant but periodical changes of occupation in the unfolding of new processes. It is a natural instinct in a boy to excel in any activity. If the new day continuation schools function as they are hoped, then we shall have a new bridge between school and workshop which should render great help towards the realisation of true welfare ideals.

The welfare scheme also embraces the consideration of all forms of labour-saving and safety devices, the prevention of fatigue, rest rooms, first-aid organisation, canteens, etc., and in all these efforts it is the object of the officer-in-charge to get the workers to put into the organisation the spirit of personal service, with the full knowledge that when workers are co-operating and associating under pleasant working conditions they will be likely to accept their duties and privileges as citizens in the world around them.

Experience has proved that only when men can exercise and develop their personality will they truly and really unite; the past system has been inclined to suppress individuality, and the result is our present discord.

Welfare in industry is a safe bridge to build for the purpose of establishing industrial peace. Labour and capital can establish through welfare that spirit of relationship which will prove their mutual interdependence, which is simply a rule of the universe, and one from which there is no escape for man, beast, plant or atom.

The following took part in the discussion on the papers by Mr. D. R. Wilson, Mr. R. R. Hyde, and Mr. F. Holden (pages 166, 175, 180);—Sir A. Newsholme (Ripon): Councillor J. C. Julyan (Poole): Dr. C. J. Coleman (Lincoln): Mr. Alfred Marsh (Chelmsford): Miss F. O'Riordan (Camberwell): Councillor T. E. Barron (Dublin): Ald. R. Montford (London).

Coal Miners' Nystagmus.

By D. Lechmere Anderson, Medical Officer of Health, Doncaster.

IF any apology was required for bringing the subject of miners' nystagmus before the members of the Sanitary Institute, the amount of the disease, the distress, suffering and anxiety to the patient, and the immense financial loss to the nation caused by it, would certainly provide one. The symptoms of the disease are so well known as scarcely to deserve mention. Briefly, they consist of the primary symptom—oscillation of the eyeballs. The oscillation may occur in several directions, but it is more generally rotatory. The movement may be fast or slow, and at times may be constant and even violent in intensity, while in other cases it can only be detected after various tests. Pain in the eyes, forehead, back of head, giddiness, night blindness, dread of light, tremors of head, neck (sometimes extending to the shoulders), nictitation or rapid blinking of the eyelids, are all of common occurrence.

The disease occurs in two chief forms, which may be described as the "Grave, Major, or Incapacitating" type and the "Minor," latent, non-incapacitating or mild. To these may be added a group of cases which may be termed "Borderline." The minor or mild cases of nystagmus, which do not prevent the man from following his employment, are exceedingly common, and it has been estimated that it is possible to elicit or detect the primary symptom of eyeball oscillation in nearly 25 per cent. of the miners engaged in our coal mines. The additional subjective symptoms are generally so slight that the men are not incapacitated from work, and are often unaware that they have nystagmus. In the major or grave cases the symptoms are much more intense and absolutely incapacitate the man from work. Happily they do not occur so frequently as the minor, considerably less than one per cent. of miners at work being rendered unfit for duty. In these cases compensation for loss of work is granted on the certificate of a certifying factory surgeon, whose certificate is, however, subject to revision by a medical referee. Borderline cases are those with symptoms midway between these types. They are frequently met with in the consulting rooms of the factory surgeon, and are especially apt to occur in dull seasons of employment, the holiday season, or when strikes threaten. In many cases they would not appear to incapacitate the man from work, in spite of assurances to the contrary from the sufferer.

Much has been done to diminish the prevalence of the disease, chiefly by improving the lighting conditions under which the work is done. This is undoubtedly in the right line, for anything by which better lightin

is produced must certainly tend to diminish eye strain. While recognising defective illumination in coal mining work as one of the chief exciting causes of miners' nystagmus and welcoming any improvement in this direction, experience tends to show that improved lighting by artificial light will never prove sufficient to eliminate the disease from our mines, and, that being so, it becomes necessary to look elsewhere for the solution of the difficulty. In my opinion, as the result of an examination of a very large number of cases of grave nystagmus, the solution is to be found by dealing with the great predisposing cause of the disease, viz. : Errors of refraction. These, when associated with the conditions of miners' work may result in miners' nystagmus at any age period. When nystagmus occurs in early life it will, however, be found that the refractive errors present are usually severe in type or abnormal in character ; the man with slight refractive errors being generally able to carry on until the great exciting cause, presbyopia or old age sight, sets in. This age occurs normally at about 40-45, and this period of life is precisely when the great majority of the cases of nystagmus occur. The point I particularly desire to emphasise is that it is not length of service, but length of life which is the great exciting cause of nystagmus.

With regard to the prevalence of refractive errors, but dealing only with cases where grave or marked nystagmus exists, I have found such errors in every case I have had the opportunity of examining, or 100 per cent. This percentage is considerably higher than that found by other observers, their percentages varying from 90 per cent. downwards, but even if the lower percentages are accepted the prevalence of refractive error must be admitted to be of very considerable amount. The discrepancy between the returns is in all probability more apparent than real. In all likelihood the lower percentages given are those of all cases of nystagmus, grave and mild alike, while the returns of my cases are practically all of grave or at the least borderline ones. I can well believe that cases of mild miners' nystagmus may occur without any marked or material error of eyesight, and if these are included in the returns they must undoubtedly have tended to blind observers in the past to the importance of refractive errors in dealing with the disease. I must repeat it is only with the grave cases of nystagmus we are specially concerned, as they are the only ones which incapacitate men from working, which cause permanent disease and injury, and which entail heavy financial loss.

Grave cases not only incapacitate from work but usually persist for considerable periods and are prone to recur with increasing severity with return to work in the mines. In many cases, coal mining has to be discontinued altogether. This discontinuance or stoppage of work generally occurs at a

period of the man's life when he has become practically unfit for any other employment, and the natural result follows that he is inclined to drift, to sink lower in the scale of society, and to become not only a burden to himself, but to others.

If the miner with apparently normal eyesight may develop nystagmus, how much more readily must the miner whose eyes have marked refractive errors, develop it ? The question is a direct one, and to anyone with the slightest elementary knowledge of the organ of sight, there can only be one answer. The greater the error, or the diversity in character of such error, the greater the liability to nystagmus, and the longer and the more serious the effects produced.

Of refractive errors the most important are those grouped under the name of astigmatism or crooked eyesight, and of these errors those in which refraction is hypermetropic in one direction and myopic in the other, are most commonly associated with grave nystagmus, but the disease is also found with the other forms of refractive error, from simple hypermetropia or long-sightedness to simple myopia or shortsightedness up to the compound varieties of these errors and to the mixed variety. Even when refractive errors are present, the disease does not usually occur until after several years of underground life, generally manifesting itself at that period of life when the natural changes which we term presbyopia, occur in the eye. The reason is not far to seek. Presbyopia induces changes in the eye, which, while not interfering with distant sight, render near sight more and more difficult without the use of proper lenses. These lenses, colliers are unable to use at work, with the result that additional strain is made upon the already overtaxed ocular system, and breakdown soon occurs. Of course this breakdown occasionally occurs long before the period of presbyopia. I have known nystagmus of a violent type manifest itself in those who have only worked comparatively short periods in the mines. In such instances refractive errors are always strongly marked, and it will practically always be found that the astigmatism is of the mixed variety with the meridians at oblique angles.

Practically every observer on the subject of nystagmus has considered the question of hereditary influence as a factor in the production of the disease, and many have furnished statistics on their inquiries. I see no reason for believing that nystagmus is hereditary, but that refractive errors are hereditary requires no proof, for it is within the experience of both professional and lay men alike, that errors of eyesight are frequently handed down from generation to generation, the children of hypermetropic, myopic or astigmatic parents having similar errors transmitted to them. As refractive errors are as commonly found among coal miners as any other class of the

community, it is only to be expected that such errors are transmitted in similar manner, and that on account of them a tendency to miners' nystagmus would be so inherited. In a word, nystagmus is not hereditary, but the refractive errors, the errors of eyesight, which are the great predisposing cause of miners' nystagmus are markedly so.

To prevent marked cases of miners' nystagmus, there is, in my opinion, only one remedy, and it is with the object of influencing the Home Office to adopt this remedy that I venture to hope the Sanitary Institute will approve of the resolution I have put upon the paper. The suggestion briefly is: That before underground work is commenced the eyesight of those intending to make it their life employment should be examined by the simple use of Snellen's test, and a standard fixed by the use of such test, which shall not be less to begin with than 6/18 for each eye separately. Those who fail to pass this test should not be at once refused employment, but referred for further examination to factory surgeons, who should have a competent knowledge of eye work, and whose duty it would then be to determine the man's fitness for the work in view. The results of both the preliminary and any subsequent test should be kept in a register for purposes of further observation, when the standard might be either raised or lowered by the result of experience. The advantages of such a test would be, in my opinion, that grave nystagmus would be practically eliminated from the coalfields, that young men, instead of entering an employment for which their physical conditions unfitted them, would be advised to find suitable work, and that many cases of defective eyesight conditions would come under notice and receive appropriate treatment.

I have already embodied the advantages of such a standard in a paper which appeared in the B.M. Journal some months ago, but as many of you will not have seen it, I repeat them.

The benefits derived from a fixed refraction standard would be :—

1. *To the individual.* (*a*) A man would be prevented at the beginning from following an employment for which he was unsuited, and which, sooner or later, would prove detrimental to his health and his life prospects. (*b*) He would, at an early age, if ametropic, come under the observation of a skilled oculist, and would learn the importance of correctly adjusted glasses and thus save his eyes from further injury. (*c*) The standard would eliminate these distressing examples of miners' nystagmus, who tend to become a burden to themselves, being unable to work as miners and unable or unwilling to follow other occupations. (*d*) It would tend to prevent injury to other workmen. The

man with marked refractive errors is a source of danger to his fellow workers.

2. *To the Owner.* (*a*) There would be a saving in the money expended in compensation, as the major types of the disease would be kept out of the mines. (*b*) The standard would tend to prevent accidents. (*c*) It would enable better coal to be got, "the men being able to see whether they are filling coal or dirt," as Sir Arthur Markham put it.

3. *To the Nation.* (*a*) It would exclude men from unsuitable employment. (*b*) It would protect the eyesight of the nation, giving useful, instead of handicapped men in other employments. (*c*) It would tend to reduce poverty, disease, alcoholism. (*d*) It would give a higher average output of coal per man.

The argument has been used that Labour would not appreciate it. This I am quite sure, is fallacious. My experience of Labour has been that in every case where it was convinced that any sanitary or preventive measure was beneficial, either for the man or for the nation, it was welcomed rather than fought against, and by the adoption of the suggested standard, no hardship could accrue to any one.

The following took part in the discussion on this paper :—Mr. B. Porter (Durham) ; Councillor J. T. Wright (Houghton-le-Spring) ; Councillor T. E. Barron (Durham) ; Dr. A. Bostock Hill (Bembridge) ; Dr. J. J. Buchan (Bradford).

CONGRESS RESOLUTION.

The following resolution was passed in Section E., Industrial Hygiene :—

RESOLVED, That the Congress of the Royal Sanitary Institute, held at Folkestone, recommends the Council of the Institute to urge upon the Home Office the advisability of fixing at the earliest opportunity a standard refraction test for coal miners before commencing work underground, with the object of diminishing the incidence of Miners' Nystagmus.

This resolution was forwarded to the Home Office, and a reply was received from the Secretary of Mines, saying "an inquiry in regard to this disease is now being conducted by a Committee appointed last year by the Medical Research Council ; and Mr. Bridgeman has accordingly referred the resolution to the Committee for their consideration."

Sewage Disposal in Colombo.

By C. L. Cox, M.Inst.C.E. (Member) and A. Bruce, B.Sc., F.R.S.E., etc.

COLOMBO, Ceylon. Population 250,000. Rainfall, 80 inches. Mean temperature 80°F. Mean humidity 80 per cent. Area 8,617 acres. 3,485 Acres fully provided with sewers, 1,623 acres with arterial sewer system, 617 acres no sewer system, and 2,892 acres of lake, swamp or not habitable.

The first instalment of the disposal works, opened in 1910, consisted of four septic tanks 240 ft. × 13 ft. × 10 ft. deep (12 hours' flow thorough capacity), with a 26 ft. detritus tank at the head of each. Eight circular ærobic beds and two storm water settling tanks and two percolating filters. The instalment was designed to serve an ultimate population of 60,000 with a dry weather flow of 1,500,000 galls. Storm flow up to twice this amount was dealt with by the septic tanks and ærobic beds and the remainder up to six times the dry weather flow by the storm tanks and filters.

The septic tanks were originally covered with a corrugated iron roof but this was removed to prevent mosquito breeding. The mean temperature of the sewage in the tanks is 85°F.

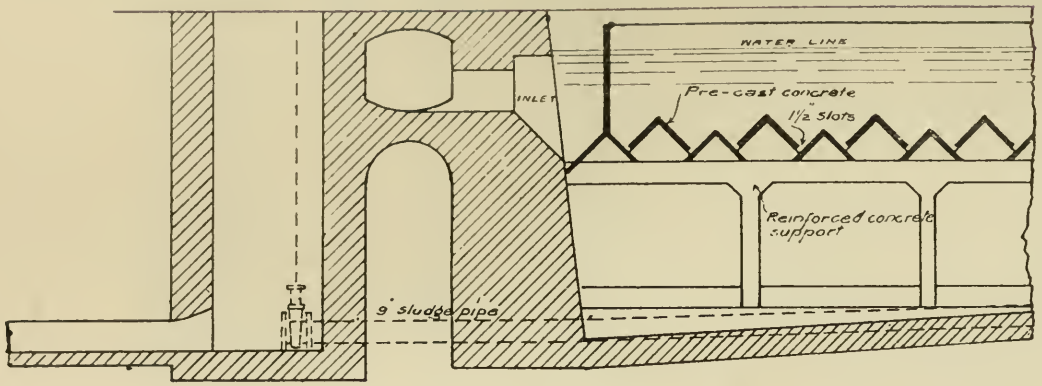
The early sewage was weak, but gasification and intense ebullition caused masses of sludge to be disgorged with the tank effluents. The ærobic beds quickly ponded and were put out of use. The material in the storm filters was removed and they were converted into additional storm tanks.

As the result of extended experiments it was determined to convert the septic tanks into two-storey sedimentation tanks.

In No. 1 tank, this was effected by longitudinal concrete slab divisions sloping from a continuous slot at each side wall to a continuous vent or scum opening in the centre (Fig. 1).

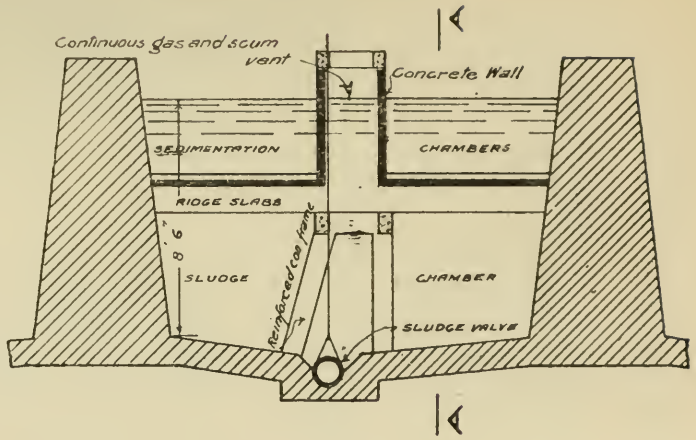
In No. 2 tank, separation between sedimentation and sludge chambers was effected by pre-cast concrete Λ shaped divisions placed laterally across the tank and forming a series of ridges and valleys through its length. The settling solids pass through slots in the valleys (the edges of adjoining slabs overlap) and the lateral divisions are divided at the centre of the tank by a continuous vent and scum chamber with which the underside of each ridge communicates (Fig. 2).

This second type was adopted because it gave greater sludge capacity below slot level, greater sectional area, and consequently less velocity of flow in the sedimentation chamber, and on the theory that as soon as the settling solids fell below ridge level (2 ft. 6 in. below sewage level), they would be less affected by the flow through the tank.



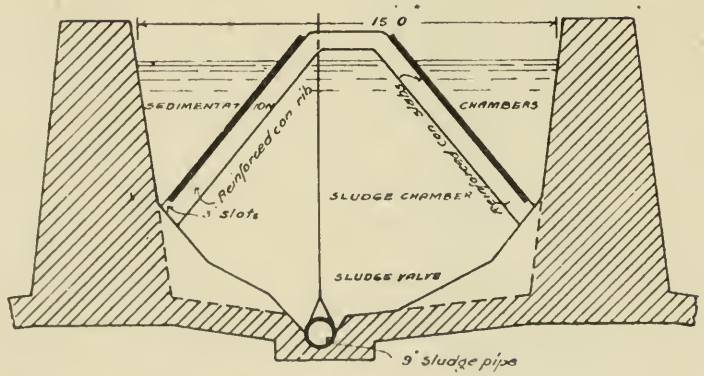
LONG SECTION OF Nº 2 TANK AT A.A.

FIG 2



CROSS SECTION OF Nº 2 TANK

FIG 2



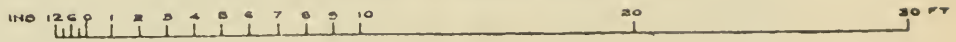
CROSS SECTION OF Nº 1 TANK

FIG 1

COLOMBO MUNICIPALITY

MADAMPITIYA TREATMENT WORKS

SCALE ¼ IN = FOOT



Later experiments appear to support this theory. It was found that whilst retaining constant volume of flow the sewage level could be reduced and the velocity of flow thereby increased as much as five times the normal, without materially affecting the percentage of solids removed.

The slope of the slabs was 51° in No. 1 tank and 45° in No. 2 tank. The steeper slope gave no advantage.

Sedimentation in both tanks is extremely effective, No. 2 giving slightly but consistently better results than No. 1.

Table A.—Details of altered tanks.

	No. 1.	*No. 2.*
Dry weather flow, gallons per day ...	375,000	375,000
Sectional area of sedimentation chamber, cu. ft.	27·6	31·4
Normal velocity of flow, ft. per min. ...	1·5	1·3
Sludge capacity to level of slots, cu. ft. ...	7,750	15,800
Length of slots per foot of tank, ft. ...	2·0	6·0
Flow through period, hours	2·7	3·0

9 in. diam. stoneware sludge pipes with valves about every 19 ft. were laid in the old longitudinal sludge chamber at the bottom of each tank.

Table B.—Typical results from altered tanks with an ordinary dry weather sewage flow.

	Suspended Solids. Parts per 100,000.	
	Volatile.	*Non-Volatile.*
Sewage	30	17
Inlet to Sedimentotion Tanks	17	8
Combined effluent from sedimentation tanks	5	1·5

Considerable reduction of suspended solids occurs before entry into the tanks. This is due partly to settlement but chiefly to scum formation in the detritus tanks and inlet channels, which require clearing at frequent intervals.

Aerobic Beds.—100 ft. diam., 5 ft. 3 in. of 2 in. stone, 12 in., ½ in. top layer; revolving sprinklers, normal rate 1,000,000 gallons per acre per day.

In a full size experimental bed, a section of 3 in. broken stone, 6 ft. 3 in. deep gave best results.

The formation under a hot sun of a leathery top coating was overcome by replacing part of the finer top layer by 4 in. of a 2½ in. material. The free passage through the coarser material and absence of sun-light from the finer layer was the apparent reason.

Imhoff Tanks.—The second instalment (for a further 60,000 population) consists of five circular radial flow Imhoff tanks, 36 ft. diam., 29 ft. deep.

The effluent contains about 2 parts per 100,000 of suspended solids more than that from the altered septic tanks.

Rectangular Tanks.—The third instalment consists of two detritus tanks and three rectangular longitudinal flow, two storey sedimentation tanks, each 81 ft. long by 36 in. wide.

When first opened the normal capacity of these tanks was overtaxed. Scum accumulated in the vent chambers rapidly and was so buoyant as to force out and dislodge the top rows of the sloping slab divisions.

As an experiment these were replaced in one tank in a vertical position, thereby increasing the surface area of the vent or scum chamber by about 60 per cent. Originally designed to deal with 335,000 gallons of dry weather sewage (velocity of flow 0·17 ft. per minute) and up to 2,000,000 galls. of storm sewage per tank per day, the altered tanks deal with 1,000,000 galls. (velocity 0·51 ft. per min.) of dry weather sewage without scum trouble.

Sewage Flow.—Although complete house drainage is ultimately intended, the present sewage is a composite sewage made up of the flow from 1,300 connected premises with 4,300 water closets, from 37 public latrines and bathing places (very largely used), considerable quantities of very foul sullage diverted from the old drain system to the new sewers and the discharge from tipping depôts at which nearly the whole of the remaining night soil is tipped into the sewers.

Considerable difficulty is experienced in obtaining representative samples of the sewage entering the works and entering the tanks owing to the heavy scum formation, and to variation in the amount of suspended solids (particularly the more resistant volatile solids) dependent on conditions of pumping, conditions in the channels and tanks and the state of the weather. The outfall discharges into the Kelani River, $2\frac{3}{4}$ miles from its mouth. The outfall is at the bank, the river is about 480 ft. wide at this point and is slightly subject to tidal influence.

It was originally intended to treat up to twice the whole dry weather flow on ærobic beds but as the minimum river discharge is estimated at 200 times, and the daily average discharge at 450 times, the ultimate dry weather flow of 8,000,000 galls., the municipality was subsequently advised to abandon or postpone the provision of further beds.

The present effluent is invisible 50 yards below the outfall, no nuisance is caused, and it is practically untraceable chemically a quarter of a mile away.

The high temperature reduces the possible oxygen content of the water, but investigations by the authors (unfortunately interfered with by the War) appear to show that sun and heat materially assist surface absorption and regeneration.

Sludge.—Sludge from the Imhoff and new sedimentation tanks amounts to about 125 cu. ft. (exclusive of scum) per 1,000,000 galls. and the moisture content varies from 88 per cent. to 93 per cent. The dry material is about one half volatile and contains 2·25 per cent. nitrogen.

The sludge is inodorous, oily in appearance and flows freely to the low drying ground where it drys quickly and without nuisance.

It is less easy to discharge undiluted sludge through the valves of the altered septic tanks and the moisture content of the sludge is considerably higher than the above mentioned figures. Attempts to utilise the partially dried sludge as manure have been temporarily abandoned pending investigation of an outbreak of hookworm amongst the coolies coming in contact with it, and the apparent survival of anchylostomiasis larvæ in sludge of all ages.

A second drainage area discharging to a sea outfall has recently been brought into operation. The first instalment provides two rectangular two storey tanks capable of dealing with the dry weather sewage from a population of 28,000.

THE ROYAL SANITARY INSTITUTE.

FOUNDED 1876.

REVIEWS OF BOOKS.

ANALYSES AND ENERGY VALUES OF FOODS.*

This series of analyses of the commoner foodstuffs was made by Captain Plimmer for the use of the Army Medical Authorities. It is an amplification of the work of Atwater & Bryant (No. 28 of the U.S. Department of Agriculture, corrected 14th April, 1906, on the Chemical Composition of American Food Materials). Captain Plimmer's chemical analyses deal with English foods in very great detail. It is regrettable, though no doubt inevitable, owing to the scope of the work, that the figures obtained should be based upon so few analyses of some of the articles. An idea of the labour involved in preparing the tables may be gained from the fact that the analyses numbered about 900, which involved over 20,000 weighings.

A feature of the work is its great detail, and that the energy values are worked out for the different parts of many meat and vegetable foods.

The supply of energy to the body is, of course, essential, and this aspect of the subject of food supply should not be obscured by the importance which recently has been attributed to vitamins.

The appendix on vitamins appears to be misleading in some respects: vegetable oils contain appreciable quantities of fat soluble A. vitamin, and lard also is not always devoid of that vitamin. The author appears to suggest that pellagra is in the same category with scurvy, beri-beri, etc., as a disease depending alone on vitamin deficiency. The low biological value of the protein consumed may be an important factor.

On page 86 it is stated that the absence of fat-soluble A. vitamin from the diet appears to be the cause of rickets. The matter appears, however, to be more complicated; causative factors involved appear to include calcium deficiency and excess of carbohydrates.

A certain amount of inconvenience may be occasioned to those consulting the book from the fact that the headings in the tables, where similar, are not always in the same order (cp., pp. 85 and 87, cheese and butter, etc.).

This book contains a very large amount of information and should be regarded as the authoritative source of information on the subject of energy values of foods. J. S. L.

DAIRY BACTERIOLOGY.†

This book has been translated from the second Danish edition (1916) and additions and revisions have been made by the translator who is chief

* ANALYSES AND ENERGY VALUES OF FOODS, by R. H. A. Plimmer, D.Sc. 8vo., 255 pp. London, 1921. H.M. Stationery Office. Price 6s.

† DAIRY BACTERIOLOGY, by Dr. Orla-Jensen, Professor of Technical Bio-chemistry in the Polytechnic College, Copenhagen. Translated by P. S. ARUP, B.Sc. 8vo., 180 pp. London, 1921. J. & A. Churchill. Price 18s.

chemist to the English Margarine Works, Ltd. It offers useful suggestions to those engaged on the various aspects of the difficult problems associated with the question of a pure milk supply, whether they be medical or veterinary officers, sanitary inspectors, analysts, or dairymen and others engaged in the trade. The chapter on how clean milk should be produced is extremely instructive, and would be a revelation to the majority of cowkeepers in this country if they read it, yet there is nothing very elaborate in the methods advocated; it is necessary for them to understand the reason for adopting a certain ritual, and then to carry it out conscientiously. Another chapter, on the preservation of milk, is extremely interesting, and methods of sterilising, pasteurising, etc., are lucidly described. One must criticise a statement on page 98 with regard to the distribution of the fat soluble vitamin: it is now held that it occurs in all green vegetables and edible substances of that kind, whence the fat soluble vitamin in milk and other articles containing animal fat is derived.

We have only referred to a few of the points touched upon in this interesting and instructive book, which contains much that is not bacteriological procedure, but is of fundamental importance in the production and sale of clean milk. J. S. L.

Veterinary Hygiene.*

Mr. R. G. Linton's book is well written and deals with the subject of Veterinary Hygiene in a comprehensive way. It should be very useful as a book of reference and also as a text book for students.

J. R. H.

Handbook for Tuberculosis Workers.†

This small book of some 66 pages is written by one who is an authority on both the administrative and clinical aspects of tuberculosis. It is a work which can easily be understood by any person of ordinary education, and contains much helpful information. The nature of the disease, its different types, the modern methods of treatment and measures adopted to control the disease, and the main objects, and to some extent, the value of the different residential institutions in which treatment is given are succinctly and carefully set out. The worker in this field of social reform and preventive medicine cannot fail to profit by a careful study of the work, and to such it is unhesitatingly recommended.

W. J. H.

Tuberculosis, Its Prevention and Home Treatment.‡

Institutional treatment for all consumptives or even a fraction of the total number of known cases is at present impossible, even if it is desir-

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* Veterinary Hygiene, by R. G. Linton, M.R.C.V.S., 8vo., 429 pp. Edinburgh, 1921. W. Green & Son, Ltd. Price 26s.

† Handbook for Tuberculosis Workers, by Noel Bardswell, M.V.O., M.D., F.R.C.P. 16 mo., 66 pp. London, 1921. John Bale, Son, and Danielson, Ltd. Price 1s. 6d.

‡ Tuberculosis, Its Prevention and Home Treatment, by H. Hyslop Thomson, M.D., D.P.H. Second Edition. 16 mo., 99 pp. London, 1921. Henry Frowde, and Hodder & Stoughton. Price 4s.

able. More and more it is being recognised that the basis of sanatorium treatment is a well-regulated life under open air conditions all the time, with sufficient exercise, rest and sleep, added to which there is a nourishing but not excessive diet.

The difficulty is to bring sanatorium conditions into the home life. How can we have moving cool air in our living rooms and bedrooms, how can we vary rest and exercise to suit our ever-changing powers of resistance, how do differences in weight and temperature help us to decide our mode of life, what symptoms make it imperative for us to consult a doctor at once? All these questions are answered fully and simply in Dr. Hyslop Thomson's book. No consumptive of ordinary intelligence can fail to grasp the guiding principles set out. A study of this book will convince him that he personally can do more than any other agent to keep the disease at bay. Although perhaps, of greatest interest to the consumptive, this book, in so far as it deals with home treatment, will prove of the greatest value to sanitary inspectors, health visitors, district nurses and voluntary workers who interest themselves in the tuberculous patient.

Methods of prevention are also discussed, but the writer does not display the same balanced judgment in dealing with this part of the tuberculosis problem; for instance, no explanation of direct droplet infection is given, which is a most serious omission in any book dealing with prevention. It should have been impressed on the reader that great danger of infection lies in close contact with a consumptive in the act of coughing, singing, or even speaking, and that massive doses inhaled under these conditions may overcome the resistance of persons in the best of health.

It is stated that tubercle bacilli "thrive in dust" (page 12), the fact being that the bacillus does not multiply to any extent outside the animal body except on prepared media in the incubator. However important it may be to impress on the consumptive the advantages of cleanliness, it should not be done by incorrect statements.

Disinfectants.—The public should be taught to rely on damp dusting and soap and water, and to avoid disinfectants which are unnecessary and in the dilutions used and the time-contact given usually quite ineffective. The following might well be omitted from future editions: "In cleansing a room carbolic acid, creolin, or other disinfectant, should be added to the water;" "soiled clothes should be placed in water to which some antiseptic should be added;" and in cleansing offices "some disinfectant may, with advantage, be added to the water."

In any new edition Table C and D, on page 57, might be replaced by average weight for height tables, which can be supplied by the school medical officers of many towns.

Notwithstanding the above criticisms this book can be thoroughly recommended because of the clear and comprehensive advice given as to the home treatment of the consumptive; it should find a place in the library of all persons interested in the home life of the tuberculous patient.

D. F.

The Water Supply of Buckinghamshire and of Hertfordshire from Underground Sources.*

This Memoir is yet another contribution, by Mr. Whitaker, to a useful series of similar publications, dealing with the underground water supplies of other counties, the value of which, to all interested in the subject, can hardly be over estimated.

About 50 pages of the work are devoted to the description of public and private wells in Buckinghamshire, those in Hertfordshire occupy nearly 100 pages, the analyses of the waters obtained from a number of which are recorded separately.

Owing to its geographical position, in relation to London and its northern suburbs, Hertfordshire has, for many years attracted an amount of attention, in connection with the water supply of the Metropolis, which is amply reflected in the numerous pages of the Memoir devoted to the bibliography of the subject.

From the reports there quoted it appears that from 1840 to 1900, the extensive water bearing chalk formation, exposed or within easy reach from the surface in this county, was the subject of so many enquiries and such continuous controversy, as had the effect of inducing an unusually large number of able and reliable observers to conduct investigations, and keep records, relating to water supply, upon a scale not often met with elsewhere.

The Memoir is arranged upon Mr. Whitaker's well known lines, dealing consecutively, in the case of each county, with the subjects of county boundaries, population, surface levels, river systems and the chief water supplies obtained from springs and wells.

There follow descriptions of the geological formations present with observations upon their water bearing beds and the springs discharged therefrom, including those having a mineral or medicinal character.

An interesting chapter on "Bournes" or intermittent springs, will be found, in which the hope is expressed that Natural History and kindred Societies, will take up the work of recording their periodical reappearance, progress, and flow. Engineers should help in and otherwise encourage, the compilation of such records, which must become of great value in drawing conclusions in connection with the not infrequent allegation that pumping has effected permanent depletion of the water in the chalk and other formations.

The following chapter, on "Swallow Holes," is of practical importance when read in conjunction with the subsequent one on "Contamination and the risk therefrom," as there is a tendency on the part of some local authorities and others to utilise sink holes and other pits and depressions in the chalk as dumps for the reception of refuse, which is of an objectionable character.

Under the heading "Pumping Interference" several well known cases are referred to, and it is a distinct advantage that they should be recorded in

* The Water Supply of Buckinghamshire and of Hertfordshire from Underground Sources, by W. Whitaker, B.A., F.R.S. 8vo., 368 pp. London, 1921. Memoirs of the Geological Survey, England and Wales. H.M. Stationery Office. Price 16s.

a standard work, such as this Memoir will certainly become, because the effects produced, by pumping, upon adjacent and even distant wells and springs, is still, and likely to remain, a very fruitful and costly source of controversy and litigation.

There is, as usual in these Memoirs, a chapter devoted to "Rainfall," rendered, in this case, the more interesting by the inclusion of notes on the results obtained from the natural percolation gauges which were established at Rothamstead in 1870.

The thanks of all who are in any way interested in water supply are due to Mr. Whitaker for collecting and placing at their disposal such a mass of useful information, much of which must otherwise have remained unknown, except to a few, and of little practical value.

As in previous Memoirs, there is a very complete and well arranged index adding considerably to the handiness of the book. W. M.

Sewers and Sewerage.*

This useful little work appears to be written as an elementary treatise upon a matter necessary to all, but of technical interest to the few. The Author is a well known civil engineer and member of the Institute, and he has dealt with his subject in a very clear and concise manner. The work is eminently practical and is full of useful information and diagrams.

The elementary laws affecting sewers, pollution of streams, etc., comprises most of the opening chapter. This is followed by simple methods of computing sewage and rainfall, whilst Chapter 3 deals with the flow of sewage in sewers.

On page 29, it would have been better to have slightly re-arranged the formulæ, which, whilst clear to the expert, is a little confusing to the student. It is a slight matter which could be easily modified in a future edition.

Other chapters deal with the construction of sewers and manholes, which are all good and show the latest practice, and the method of treating hilly districts is also well explained with drawings illustrating the text.

That very vexed question of sewer gas and ventilation of sewers is briefly dealt with in Chapter 7, whilst storm overflows and inverted syphons are explained in the following chapters. Even sewage lifts and ejectors are not only explained, but diagrams illustrating their use are shown.

After some notes on the Separate System and cleaning and flushing sewers, the Author concludes with a very descriptive explanation of levelling, setting out and constructing an ordinary sewer in open cutting and in tunnel.

To the student the work is admirably concise, up to date and well worthy of perusal, and it should also be extremely useful to members of the allied professions who at times have to deal with minor sewerage problems, as the Author has had a wide experience and has given his readers the benefit of same.

Books of this character are never redundant, and to the pupil or beginner it affords really sound and useful instruction. E.W.

* Sewers and Sewerage, by H. Gilbert Whyatt, M.Inst.C.E., M.R.San.I., M.Inst.M. and C.E. 16mo., 118 pp. London, 1921. Sir Isaac Pitman & Sons, Ltd. Price 2s. 6d.

MEETINGS HELD.

Sessional Meetings.

Stoke-on-Trent.—The meeting was held in the Town Hall on Friday, October 7th. Discussion on "Activated Sludge" was opened by W. H. Makepeace, Borough Sewage Engineer, and on "Smoke Pollution of the Atmosphere in the Potteries," by G. Petgrave Johnson, M.D., D.P.H., Medical Officer of Health. The Chair was taken by Prof. H. R. Kenwood, C.M.G., M.B., F.R.S.E., Chairman of Council. Mr. Councillor Sampson Walker, the Mayor, received and entertained the members at tea and luncheon.

On Saturday, October 8th, visits were made to an activated sludge plant, pottery works, housing scheme sites, model Iwel meat and fish salvage plant, and the Infectious Diseases Hospital, at Bucknall, where the members were entertained to tea by the Joint Hospitals Board.

London.—A meeting was held at the Institute on Wednesday, October 12th, when a discussion on "Plumbing and Sanitation on Board Ship" was opened by J. L. Smyth, Assistant General Secretary, United Operative Plumbers and Domestic Engineers' Association. The Chair was taken by Sir Henry Tanner, C.B., I.S.O., F.R.I.B.A., Deputy Chairman of Council.

Examinations.

Since the last issue, the following examinations have been reported :—

Perth, Western Australia, April 22nd and 23rd.
Wellington, New Zealand, July 6th.
Bombay, July 8th, 9th and 11th.
Georgetown, British Guiana, July 9th, 11th and 12th.
York, October 7th and 8th.
Leicester, October 14th and 15th.

At these examinations 158 candidates presented themselves, and the following were awarded certificates :—

Sanitary Science as applied to Buildings and Public Works.

Allan, Charles Scott, *Wellington, New Zealand.*

Law, Sydney, *Perth, Western Australia.*

Needham, Frank Carlisle, *Nottingham.*

Women Health Visitors and School Nurses.

ARCHER, JENNIE, *Gateshead.*
BUGG, MAUD ANNIE, *Leicester.*
CUMMINGS, AGNES ELIZABETH, *Smethwick.*
DEXTER, AMY, *Leicester.*
FARRER, DORIS MARION, *Scarborough.*
FORD, SELINA, *Smethwick.*
HENDERSON, LUCY, *Forest-Hall.*
HENDRICKS, MAY GLASGOW, *Georgetown, British Guiana.*
MCANDREW, ELMA CELISTE, *Bourda, British Guiana.*
MOORE, MARJORIE KATHLEEN, *Leeds.*
O'HURLEY, ELIZABETH, *Leicester.*
SUMMERS, MARGARET BARR, *Leeds.*
WILSON, KATHLEEN ELOISE, *Georgetown, British Guiana.*
WRIGHT, LOUISA, *Leicester.*

School Hygiene, including Elementary Physiology.

CARLSEN, PETER OLUFF, *Guildford, Western Australia.*

Inspectors of Nuisances.

BARRETT, JOHN GORDON, *Loughborough.*
CHURNSIDE, JOSEPH, *Barrow.*
HAWKINS, HERBERT SYDNEY, *King's Lynn.*
HOPKINS, HARRY, *Wirksworth.*
HUGHES, ABRAHAM JOSIAH, *Georgetown, British Guiana.*
KELLETT, FLORENCE, *Headingley.*
MCKENZIE, RICHARD JAMES, *Christchurch, New Zealand.*
MERKLE, JONATHAN KEILLER, *Essequebo, British Guiana.*
MOONSAWMY, HARRY AUGUSTINE, *Leguan, British Guiana.*
MORRISON, SAMUEL DAVID, *Georgetown, British Guiana.*
SILSBURY, EDWIN GEORGE, *Merridin, Western Australia.*
STEWART, PERCY ANDREW VICTOR, *York, Western Australia.*
WHITE, ANNIE, *Nottingham.*
WILLIS, IDA GRACE, *Wellington, New Zealand.*

Smoke Inspectors.

MATHER, ROBERT HUGH, *Nuneaton.*

For Sanitary Surveyors, India.

N. B. ATPATKAR, *Dharwar.*
S. W. BALGI, *Bombay.*
BADAN CHAND BHANDARI, *Jodhpur.*
KAILASHCHANDRA BHATNAGAR, *Meerut.*
T. R. BULDEO, *Nagpur.*
NAGANDRA KUMAR CHAKRAVARTY, *Dacca.*
B. A. CONTRACTOR, *Bombay.*
SHASHI KUMAR DAS, *Shillong.*
V. H. DATE, *Girgaum.*
KSHITISH CHANDRA DATTA, *Sylhet.*
HIMATLAL CHHOTALAL DAVE, *Umreth.*
RADHA GOVINDA DEBNATH, *Parel.*
W. B. DESHPANDE, *Murtizapur.*
SHASHANKA SHEKHAR DHAR, *Diabari.*
W. D. DIXIT, *E. Khandesh.*
ROMESH CHANDRA DUTT, *Sylhet.*
RAMESH CHANDRA SEN GUPTA, *Shillong.*
HARAN CHANDRA DAS GUPTE, *Shillong.*
R. L. JAGAVKAR, *Parel.*
N. B. JOSHI, *Parel.*
J. V. KALE, *Nagpur.*
BHASKAR GANGADHAR KELKAR, *Girgaum.*
MOHOMED ABDUL MAJEED KHAN, *Nanded.*
H. R. KUKNUR, *Poona.*
G. K. KULKARNI, *Dharwar.*
R. D. KULKARNI, *Dharwar.*
R. N. KULKARNI, *Wardha.*
T. N. KULKARNI, *Bombay.*

B. H. Madan, *Bombay.*
K. N. Mahabaleshwarker, *Jawhar.*
Kaluram Nago Marathe, *Bombay.*
Shanker K. Muley, *Nagpur.*
Jethmal Nebhraj, *Larkhana.*
A. B. Nimbalker, *Nagpur.*
Kashav Atmaram Padgawkar, *Bombay.*
R. A. Parulekar, *Parel.*
K. R. Patel, *Betul.*
U. S. Patel, *Andheri.*
Manishanker B. Pathek, *Cambey.*
G. A. Patil, *Dharwar.*
G. K. Phatak, *Bombay.*
Lok Nath Raheja, *Bombay.*
K. Hanumanta Rao, *Bombay.*
Jatindra Mohan Roy, *Sylhet.*
Radhika Mohan Roy, *Tippera.*
Profulla Mohan Sanyal, *Parel.*
Dattatraya Bapu Savant, *Bombay.*
Raja Ram Sharma, *Meerut.*
Bapurao Wamanrao Shitole, *Bombay.*
John Reuben Simon, *Hyderabad.*
Gulabmal Budhmal Singhi, *Jodhpur.*
J. F. Taraporevala, *Bombay.*
R. V. Vaishnav, *Kathiawar.*
R. P. Vedak, *Byculla.*
Mohanlal Gopalji Vyas, *Ahmedabad.*
Hiralal Mulshanker Vyas, *Ahmedabad.*
Sitaldas Sabaldas Wadhwani, *Larkhana.*
J. L. Whitcombe, *Bombay.*

FORTHCOMING MEETINGS.

Examinations.

In Sanitary Science as applied to Buildings and Public Works, for Inspectors of Nuisances, Maternity and Child Welfare Workers, Women Health Visitors and School Nurses, and School Hygiene, including Elementary Physiology, will be held at :—

Manchester, November 18th, 19th.
London, December 9th, 10th.
Adelaide, December.
Auckland, N.Z., December.
Christchurch, N.Z., December.
Hereford, January 20th, 21st.
Plymouth, February 3rd, 4th.

For Inspectors of Meat and other Foods :—

Newcastle, November, 11th, 12th.
Liverpool, November 25th, 26th.
London, December 16th, 17th.

Sessional Meetings.

Meetings will be held early next year at Blackburn, Leeds and Norwich. Announcements of the dates arranged and the subjects to be brought forward for discussion will be given in the January issue of the Journal.

Calendar for November and December, 1921.

NOVEMBER.

1 Tu. Lecture to Sanitary Officers at 6 p.m. Sewerage, by H. C. Adams, M.INST.C.E.

2 W. Inspection and Demonstration in the District of Chiswick, at 2.30 p.m. Conducted by J. H. Clarke, Chief Sanitary Inspector, Chiswick.

2 W. Lecture to Health Visitors and Child Welfare Workers, at 6 p.m. Official and Voluntary Agencies Administering to Child Welfare: the Children Act, by Charles Porter, M.D., B.SC.

4 F. Lecture to Sanitary Officers, at 6 p.m. Sewage Disposal, by H. C. Adams.

4 F. Lecture to Health Visitors and Child Welfare Workers, at 6 p.m. Prevention of Communicable Disease, by R. Veitch Clark, M.A., M.D., M.O.H., Croydon.

4 F. Lecture to Meat Inspectors, at 6 p.m., by J. R. Hayhurst, M.R.C.V.S., D.V.S.M.

5 S. Inspection and Demonstration at East Ham Refuse and Sewage Disposal Works, at 2.30 p.m. Conducted by H. C. Adams, M.INST.C.E.

5 S. Demonstration to Health Visitors and Child Welfare Workers, in the Parkes Museum at 3 p.m. Conducted by J. H. Clarke, Chief S.I., Chiswick.

7 M. Lecture to Sanitary Officers, at 6 p.m. Water Supply, Sources of Supply and Distribution, by H. C. Adams, M.INST.C.E.

7 M. Lecture to Health Visitors and Child Welfare Workers, at 6 p.m. Prevention of Communicable Disease, by R. Veitch Clark, M.A., M.D., B.SC., D.P.H.

9 W. Lecture to Sanitary Officers at 6 p.m. Scavenging, Disposal of House Refuse, by W. R. Hicks, A.M.INST.C.E., Borough Engineer and Surveyor, Ealing.

9 W. Lecture to Health Visitors and Child Welfare Workers, at 6 p.m. Tuberculosis, by R. Veitch Clark, M.A., M.D., B.SC., D.P.H.

11 F. Lecture to Sanitary Officers and Commissioned Officers, at 6 p.m. The Laws, By-Laws, and Regulations affecting the Sale of Food, by J. Spencer Low, C.B.E., M.B., B.SC., D.P.H.

11 F. Lecture to Health Visitors and Child Welfare Workers, at 6 p.m. Venereal Diseases, by J. Letitia Fairfield, C.B.E., M.D., D.P.H.

11 F. } Meat Examination—Newcastle.
12 S. }

12 S. Demonstration—Meat Inspectors, at the Metropolitan Cattle Market, at 12.30 p.m.

12 S. Inspection and Demonstration at the Sewage and Destructor Works, Ealing, at 2.15 p.m. Conducted by W. R. Hicks, A.M.INST.C.E., Borough Engineer and Surveyor, Ealing.

12 S. Demonstration to Health Visitors and Child Welfare Workers, in the Parkes Museum, at 3 p.m. Conducted by J. H. Clarke.

14 M. Lecture to Commissioned Officers, at 4 p.m. Meat Inspection, by J. R. Hayhurst, M.R.C.V.S.

14 M. Lecture to Sanitary Officers and Commissioned Officers, at 6 p.m. The Appearance and Character of Fresh Meat and other Foods, by J. Spencer Low, C.B.E., M.B., B.SC., D.P.H.

14 M. Lecture to Health Visitors and Child Welfare Workers, at 6 p.m. Ante-natal Hygiene (1), by Margaret G. Thackrah, B.A., M.D., M.R.C.P.

15 Tu. Inspection and Demonstration at the Metropolitan Cattle Market, at 11 a.m. Conducted by J. R. Hayhurst, M.R.C.V.S., D.V.S.M.

15 Tu. Demonstration to Commissioned Officers, at Smithfield Market, at 11 a.m. Conducted by Lieut.-Colonel T. Dunlop Young, O.B.E., M.R.C.V.S., D.V.S.M.

15 Tu. Introductory Lecture to Commissioned Officers, at 3.30 p.m., by Colonel C. H. Melville, C.M.G., M.B.

16 W. Inspection and Demonstration at Van de Bergh's Margarine Factory, Townmead Road, Fulham, at 2.30 p.m.

16 W. Lecture to Sanitary Officers and Commissioned Officers, at 6 p.m. Signs of Health and Disease in Animals Destined for Food, by J. R. Hayhurst, M.R.C.V.S., D.V.S.M.

16 W. Lecture to Health Visitors and Child Welfare Workers, at 6 p.m. Ante-Natal Hygiene (2), by Margaret G. Thackrah, B.A., M.D., M.R.C.P.

17 Th. Demonstration to Commissioned Officers at the Islington Cattle Market, at 11 a.m. Conducted by J. R. Hayhurst, M.R.C.V.S., D.V.S.M.

17 Th. Lecture to Commissioned Officers, at 3.30 p.m. Vegetables and Fruits, Jams, Condiments, etc., Prepared, Concentrated and Preserved Foods, by Colonel C. H. Melville, C.M.G., M.B.

18 F. Lecture to Commissioned Officers, at 3.30 p.m. Canteen Supplies, Eggs, Butter, Cheese, Bacon, Lard, by C. L. T. Beeching, F.G.I.

18 F. Lecture to Sanitary Officers and Commissioned Officers, at 6 p.m. The Names and Situations of the Organs of the Body in Animals, by Lieut.-Colonel T. Dunlop Young, O.B.E., M.R.C.V.S., D.V.S.M. (Lond.).

18 F. Lecture to Health Visitors and Child Welfare Workers, at 6 p.m. Care of Mother and Infant (1), by Margaret G. Thackrah, B.A., M.D., M.R.C.P.

18 F.
19 S. } Examinations—Manchester.

19 S. Demonstration—Meat Inspectors, at the Metropolitan Cattle Market, at 12.30 p.m.

19 S. Demonstration to Health Visitors and Child Welfare Workers, in the Parkes Museum, at 3 p.m. Conducted by J. H. Clarke.

21. M. Lecture to Commissioned Officers, at 3.30 p.m. Canteen Supplies, Tea, Coffee, Cocoa, Chocolate, Sugar, by C. L. T. Beeching, F.G.I.

21 M. Lecture to Sanitary Officers and Commissioned Officers, at 6 p.m. Practical Methods of Stalling and Slaughtering Animals, by Lieut.-Colonel T. Dunlop Young, O.B.E., M.R.C.V.S., D.V.S.M. (Lond.).

21 M. Lecture to Health Visitors and Child Welfare Workers, at 6 p.m. Care of Mother and Infant (2), by Margaret G. Thackrah, B.A., M.D., M.R.C.P.

22 Tu. Demonstration to Commissioned Officers at Smithfield Market, at 11 a.m.

22 Tu. Lecture to Commissioned Officers, at 3.30 p.m. Alcoholic Beverages, Beer, Whiskey, Brandy, etc., by Colonel C. H. Melville, C.M.G., M.B.

23 W. Demonstration—Meat Inspectors, at Smithfield Market, at 11 a.m.

23 W. Lecture to Sanitary Officers and Commissioned Officers, at 6 p.m. Diseased Meat, with a Demonstration of Morbid Specimens collected from Meat Markets, by J. R. Hayhurst, M.R.C.V.S., D.V.S.M.

23 W. Inspection and Demonstration in the District of Islington, at 2.30 p.m. Conducted by James R. Leggatt, Superintendent, Public Health Department, Borough of Islington.

23 W. Lecture to Health Visitors and Child Welfare Workers, at 6 p.m. Infant Feeding, by G. Eric Pritchard, M.A., M.D., M.R.C.P.

24 Th. Demonstration to Commissioned Officers, at Islington Cattle Market, at 11 a.m.

24 Th. Lecture to Commissioned Officers at 3.30 p.m. Canteen Supplies, Rice, Arrowroot, Flour, Biscuits, by C. L. T. Beeching, F.G.I.

25 F. Lecture to Commissioned Officers, at 4 p.m. Meat Inspection, by J. R. Hayhurst, M.R.C.V.S.

25 F. Lecture to Sanitary Officers and Commissioned Officers, at 6 p.m. The Hygiene of Cowsheds, Dairies and Slaughterhouses, by J. Spencer Low, C.B.E., B.SC.

25 F. Lecture to Health Visitors and Child Welfare Workers, at 6 p.m. Infant Feeding, by G. Eric Pritchard, M.A., M.D., M.R.C.P.

25 F.
26 S. } Meat Examination—Liverpool.

26 S. Demonstration—Meat Inspectors, at the Metropolitan Cattle Market, at 12.30 p.m.

26 S. Demonstration to Health Visitors and Child Welfare Workers, in the Parkes Museum, at 3 p.m. Conducted by J. H. Clarke.
28 M. Visit to Factory for Commissioned Officers, conducted by C. L. T. Beeching.
28 M. Lecture to Meat Inspectors and Commissioned Officers, at 5 p.m. Food Accessory Substances, Milk, Butter, Cheese, by W. J. Howarth, C.B.E., M.D., D.P.H., M.O.H., City of London.
28 M. Lecture to Health Visitors and Child Welfare Workers, at 6 p.m. Food and Clothing, by A. Beresford Kingsford, M.D., D.P.H.
29 Tu. Demonstration to Commissioned Officers at Smithfield Market, at 11 a.m.
29 Tu. Lecture to Commissioned Officers, at 3.30 p.m. Canteen Supplies, Jams, Preserved Fruits, Condiments, Lime Juice, etc., by C. L. T. Beeching, F.G.I.
30 W. Lecture to Meat Inspectors and Commissioned Officers, at 5 p.m. Bread, Eggs, Tea, Coffee, Cocoa, and Other Foods, by W. J. Howarth, C.B.E., M.D.
30 W. Lecture to Health Visitors and Child Welfare Workers, at 6 p.m. Care of Infants and Young Children, by Miss Isabel Macdonald.

DECEMBER.

1 Th. Demonstration to Commissioned Officers, at Islington Cattle Market, 11 a.m.
1 Th. Demonstration to Commissioned Officers, at 3.30 p.m. Canteen Supplies, Jams, Preserved Fruits, etc., by C. L. T. Beeching, F.G.I.
2 F. Lecture to Commissioned Officers, at 4 p.m. Meat Inspection, by J. R. Hayhurst, M.R.C.V.S.
2 F. Lecture to Meat Inspectors, at 6 p.m., by J. R. Hayhurst, M.R.C.V.S., D.V.S.M.
3 S. Demonstration—Meat Inspectors, at the Metropolitan Cattle Market, 12.30 p.m.
5 M. Visit to Factory for Commissioned Officers, conducted by C. L. T. Beeching.
5 M. Lecture to Meat Inspectors and Commissioned Officers, at 5 p.m. Imported Meat, Cold Storage, Tinned and Potted Foods, Bacon and Hams, by W. J. Howarth, C.M.G., M.D., D.P.H.
6 Tu. Demonstration to Commissioned Officers at Smithfield Market, at 11 a.m.
6 Tu. Lecture to Commissioned Officers, at 3.30 p.m. Canteen Supplies, Canned and Cured Meats and Fish, Sausages, by C. L. T. Beeching, F.G.I.
7 W. Lecture to Commissioned Officers, at 4 p.m. Meat Inspection, by J. R. Hayhurst, M.R.C.V.S.
7 W. Demonstration in Fish Inspection for Meat Inspectors and Commissioned Officers, at the Institute, at 6 p.m., by Charles Hattersley, Chief Fish Inspector, Fishmongers' Company.
8 Th. Demonstration to Commissioned Officers at the Islington Cattle Market, 11 a.m.
8 Th. Visit to Factory for Commissioned Officers, conducted by C. L. T. Beeching.
9 F. Demonstration to Commissioned Officers at Billingsgate Fish Market, at 9 a.m.
9 F. Lecture to Commissioned Officers, at 4 p.m. Meat Inspection, by J. R. Hayhurst, M.R.C.V.S.
9 F. Lecture to Meat Inspectors, at 6 p.m., by J. R. Hayhurst, M.R.C.V.S., D.V.S.M.
9 F. } Examination—London.
10 S. }
10 S. Demonstration—Meat Inspectors, at the Metropolitan Cattle Market, 12.30 p.m.
12 M. Demonstration for Commissioned Officers, at Billingsgate Fish Market, at 9 a.m.
12 M. Lecture to Commissioned Officers, at 4 p.m. Meat Inspection, by J. R. Hayhurst, M.R.C.V.S.
13 Tu. Demonstration to Commissioned Officers at Smithfield Mraket, at 11 a.m.
13 Tu. Visit to Factory for Commissioned Officers, conducted by C. L. T. Beeching.
14 W. Demonstration to Commissioned Officers at the Army and Navy Stores, Francis Street, Westminster, at 11 a.m. Fruit and Vegetables. Conducted by Mr. Brown, Manager of the Fruit and Vegetable Department.
16 F. } Meat Examination—London.
17 S. }
25 Su. **Christmas Day.**
26 M. **Bank Holiday.**

LIST OF MEMBERS AND ASSOCIATES

ELECTED OCTOBER, 1921.

* Sanitary Science Certificate.
§ Sanitary Surveyors' (India) Certificate.
w Maternity and Child Welfare Workers' Certificate.
m Inspectors of Meat and other Foods Certificate.
‡ Inspector of Nuisances' Certificate.
v Women Health Visitors' and School Nurses' Certificate.
‖ Smoke Inspectors' Certificate.

MEMBERS.

4761 1921. Oct. AHLUWALIA, Nur Chand, B.SC., *c/o Messrs. Grindlay & Co., Bankers, Fort, Bombay, India.*

4762 1921. Oct. ANDREADS, Angelus Isidor, *Civil Engineer, 25, Lenton Avenue, Nottingham.*

4763 1921. Oct. BARI, Mohamed Abdul, B.SC., *13, Aberdeen Road, Clifton, Bristol.*

4764 1921. Oct. ‡*m*BLUNDELL, Herbert Keswick, *Ivy House, Bridge, Canterbury.*

4765 1921. Oct. BOWLES, Reginald Ewart, B.SC., *71, Scarisbrick New Road, Southport.*

4789 1921. Oct. §CHATTERJEE, Dharoni Kanto, *c/o Aboni Kanto Chatterjee, Contractor, Station Road, Chettagong, Bengal, India.*

4766 1921. Oct. DAVIES, Idris, *Architect and Engineer, P.O. Box 80, Nairobi, Kenya Colony, B.E. Africa.*

4790 1921. Oct. *vw*DAVIES, Miss Janet Hopkin, *Senior Health Visitor, Council Offices, Pontypridd, Glam.*

4793 1909. April HAYLER, Guy Wilfrid, *1473, Bash Street, San Francisco, Cal., U.S.A.*

4767 1921. Oct. HELLIER, Stanley John, P.A.S.I., A.M.INST.M. & C.E., *57, Victoria Road, Aberavon, Port Talbot, Glam.*

4768 1921. Oct. HOBBS, John, M.INST.M. & C.E., *Highway Surveyor and Architect, Swanton Court, Sevington, near Ashford, Kent.*

4769 1921. Oct. ‡JOHNSON, Matthew David, *2, Lyncot Road, Aintree, Liverpool.*

4770 1921. Oct. JOLLY, Robert Henry Hatten, M.D., D.P.H. (*Assist. M.O.H.*), *12, Market Buildings, Vicar Lane, Leeds.*

4771 1921. Oct. KATKORIA, Chhabildas Rughnathji, B.E. (BOMB.), *c/o The Andhra Valley Power Supply Co., Ltd., Section Dam Construction, P.O. Thokarvadi, Poona, India.*

4791 1921. Oct. *KERMACK, John Ferguson, *Box 45, Benoni, Transvaal, South Africa.*

4772 1921. Oct. LILLEY, Arthur Samuel, A.M.INST.C.E., *Engineer and Surveyor, Public Offices, Cheriton, Kent.*

4773 1921. Oct. LOWE, Clement Procter, *Superintendent, Public Works Department, Kuching, Sarawak.*

4774 1921. Oct. ‡*m*MCALLISTER, William Pringle, *Glencoe Villa, South Kirkby, near Wakefield.*

4775 1921. Oct. MACKENZIE, Sir William Leslie, M.D., D.P.H., F.R.C.P., *14, Belgrave Place, Edinburgh.*

4776 1921. Oct. MATTHEWS, Demos Walter, *Chief Sanitary Inspector, Public Health Department, Town Hall, Stoke Newington, N.16.*

4777 1921. Oct. MEHTA, D. R., *Medical Officer of Health, Municipal Board, Dehra Dun, U.P., India.*

4778 1921. Oct. MEHTA, Framroze M., *Sanitary Inspector, Crater, Aden, Arabia.*

4779 1921. Oct. NARAYAN, Ram. L.M. & S. (PUNJAB), D.P.H. (LOND), *c/o The Post Master, Lyall Pore, Punjab, India.*

4780 1921. Oct. PEPLER, George Lionel, F.S.I., *Chief Town Planning Inspector, Ministry of Health, Whitehall, S.W.1.*

4781 1921. Oct. PICKEN, Ralph Montgomery Fullarton, B.SC., M.B., CH.B., D.P.H. (*M.O.H.*), *City Hall, Cardiff.*

4782 1921. Oct. RODRIGO, John Andrew Vincent, *Civil Engineer, Kirkby, Panadure, Ceylon.*

4792 1921. Oct. *vw*SKENE, Miss Lily, *76, Marlborough Buildings, Walton Street, Chelsea, S.W.3.*

4783 1921. Oct. STALLWOOD, H. A., *Government Architect, Singapore, Straits Settlements.*

4784 1921. Oct. STOTT, William, M.B., B.S., D.P.H., *Mavis Bank, Wilmslow, Cheshire.*

4785 1921. Oct. TIWARI, Charan Das, M.B., B.S. (PUNJAB), D.P.H.(LOND.), *P.O. Nahan, Sirmoor State, Punjab, India.*

4786 1921. Oct. TURNER, Adam Annand, M.C., M.B. CH. B., D.P.H., (*Dep., M.O.H.*), *Town Hall, St. Helens, Lancs.*

4787 1921. Oct. UBERSI, Pershori Lal, L.S.E. (BOMB.). *c/o Lalla Nanak Chand, Appeal Writer, Mardan, N.W.F.P., India.*

4788 1921. Oct. WHITEHEAD, Henry, M.D., D.P.H. (*M.O.H.*), *Public Health Office, Library Street, Wigan, Lancs.*

ASSOCIATES.

8623 1921. Oct. ‡ANDERSON, John, *Barlow Street, Clayfield, Brisbane, Queensland.*

8624 1921. Oct. ‡BAIRDOW, Robert Frederick, *3, Tucker Street, Belgravia, Johannesburg, South Africa.*

8625 1921. Oct. ‡BENNETT, Alexander, *3, Cross Lane, Buckie, Banffshire, Scotland.*

8626 1921. Oct. ‡BOOTH, Arthur, *County Surveyor's Department, County Buildings, Stafford.*

8627 1921. Oct. ‡BYRES, Robert, *425, Longmarket Street, Pietermaritzburg, Natal, South Africa.*

8628 1921. Oct. ‡CALLEJA, Paolino, *204, Sda. Due Porte, Sanglea, Malta.*

8629 1921. Oct. ‡CHEDBURN, George Stewart, *Chief Sanitary Inspector, Municipal Offices, Cape Town, South Africa.*

8630 1921. Oct. ‡COLMAN, Harry Thomas, *29, Pietermaritz Street, Pietermaritzburg, Natal, South Africa.*

8631 1921. Oct. ‡CRAN, Newell Burnett, *Town Engineer's Assistant, Town Hall, Salisbury, S. Rhodesia.*

8632 1921. Oct. ‡DONELLY, Ernest, *West Street, Wigton, Cumberland.*

8633 1921. Oct. ‡DONN, John Hartley, *26, Belmont Road, Mowbray, Cape Town, S. Africa.*

8634 1921. Oct. ‡GROOM, Albert Charles, *37, Northcroft Road, West Ealing, W.13.*

8635 1921. Oct. ‡HAULDREN, Arthur Bell, *125, Beech Street, Crewe.*

8636 1921. Oct. ‡HAY, John Munro, *89, Rustenburg Road, West Krugersdorp, Transvaal, S. Africa.*

8637 1921. Oct. ‡HILLARY, Mrs. Emily Frances, *Hopefield, Gordon's Bay, Cape Province, South Africa.*

8638 1921. Oct. ‖‡*m*HOLLAND, Albert, *6, Albert Square, Ella Street, Hull.*

8639 1921. Oct. *v*LOWNDES, Miss Margaret, *44, Union Street, Desborough, Northants.*

8640 1921. Oct. ‡LUPTON, George Blackwell, *Sanitary Inspector, Scotsville, Pietermaritzburg, Natal, South Africa.*

8641 1921. Oct. ‡MCLYNCHY, Royal, *"Glenawldyn," Marpool Hill, Exmouth, Devon.*

8642 1921. Oct. *v*MARSHALL, Miss Grizel, *St. Mary's Drive, Kirkcudbright, Scotland.*

8643 1921. Oct. *v*MARTIN, Miss Lilian, *Abbey Cottage, Abbey Road, Harborne, Birmingham.*

8644 1921. Oct. ‡MATTHEWS, Frederick Robert, *5, College Road, Exeter.*

8645 1921. Oct. *v*MILNE, Miss Agnes Henderson, *James Grove, Kirkcaldy, Fife.*

8646 1921. Oct. *v*MONK, Miss Winifred May, *31, Campion Road, Colchester.*

8647 1921. Oct. ‡NAUGHTIN, Thomas Hugh, *109, Warwick Road, New Southgate, N.11.*

8648 1921. Oct. ‡PAINE, Richard William Whitfield, *c/o Miss Thicthener, Old Spes Bona, 23, Union Street, Cape Town, South Africa.*

8649 1921. Oct. ‡PARKER, Henry Hartford, *56, Napoleon Street, Battery Point, Hobart, Tasmania.*

8650 1921. Oct. ‡PENN, George Henry, "*Avon More,*" *Sheering Mill Road, Sawbridgeworth, Herts.*

8670 1921. Oct. ‡PENROSE, James William Henry, "*Wayside,*" *Vapron Road, Plymouth.*

8651 1921. Oct. ‡PETERS, William, "*Risley,*" *Franz Road, Clayfield, Brisbane, Queensland.*

8652 1921. Oct. ‡PUGH, Levi, *Officer-in-Charge, Quarantine Station, Lytton, Queensland.*

8653 1921. Oct. *v*REAR, Miss May, *Maternity and Child Welfare Centre, Central Hall, Bermondsey, S.E.*

8654 1921. Oct. ‡RILETT, John, *Barkston-le-Willows, near Grantham.*

8622 1921. Oct. ROSS, John, *Sanitary Inspector's Office, Town Hall Buildings, St. Andrews, Fife.*

8655 1921. Oct. ‡SHERRATT, Edgar Garnet, "*Strathmore,*" *53, Lilleshall Street, Longton, Stoke-on-Trent.*

8656 1921. Oct. *v*SLACK, Miss Margaret Elizabeth, *26, Raglan Road, Burnley.*

8657 1921. Oct. ‡SMITH, Harold, *79, Maryvale Road, Bournville, Birmingham.*

8658 1921. Oct. ‡SMITH, Miss Jessie, *160, Ashton New Road, Beswick, Manchester.*

8659 1921. Oct. *v*SOUTHALL, Miss Bessie Irene, *Victoria House, Saffron Walden.*

8660 1921. Oct. *m*SUCKSMITH, Richard, *5th Avenue, Park Town N., Johannesburg, South Africa.*

8661 1921. Oct. *m*THOMPSON, Charles, *Box 110, Randfontein, South Africa.*

8662 1921. Oct. *v*THOMPSON, Miss Rosina Penney, *31, The Green, Creaton, near Northampton.*

8663 1921. Oct. ‡TYLER, Albert, *15, Beaufort Road, Barton Hill, Bristol.*

8664 1921. Oct. ‡TYLER, Richard Joseph, *7, Durham Road, Sidcup, Kent.*

8665 1921. Oct. ‡WARNER, Percy Albert, '*Omdurman,*" *52, Croft Road, Godalming, Surrey.*

8666 1921. Oct. ‡WATERS, Miss Blanche, *114, Westbourne Terrace, Paddington, W.2.*

8667 1921. Oct. ‡WHITE, Arthur Joseph, *c/o Messrs. Wright & McKenzie, 60, Queen Street, Melbourne, Australia.*

8668 1921. Oct. *v*WILLIAMS, Miss Florence Helen, *Beechwood, Gomersal, near Leeds.*

8671 1921. Oct. ‡WILLIAMS, The Rev. D., *Dukestown, Tredegar, South Wales.*

8669 1921. Oct. ‡WRIGHT, Edward Henry, "*Parkside,*" *Washington Street, Victoria Park, Western Australia.*

OBITUARY.

It is with regret that we have to report the death of the following Honorary Fellows, Fellow, Members and Associates :—

Hon. Fellows.—Dr. A. J. Martin, the Médecin-Chef de l'Hôpital Pasteur, in Paris, and who had been an Honorary Fellow since 1903.

Dr. Léon Becerra, the Director-General of Public Health for Ecuador, who had only recently been elected an Honorary Fellow.

Professor Dr. Albert Palmberg, of Helsingfors, Finland.

Fellow.—George Wilson, M.A., M.D., whose name appeared on the first list of members of the Sanitary Institute of Great Britain in 1876. He was for over 30 years Medical Officer of Health for the Mid-Warwickshire Combined Districts.

Members.—George Hart Anderson, for many years the Chief Sanitary Inspector of Middlesbrough, and a familiar figure at the Institute's Congresses.

Rones Chandra Das of Howrah, Bengal.

Luke Mullock Hill, a Civil Engineer, who was for some years in the British West Indies.

John Manley, of Wokingham, who had been a Member for more than 20 years.

Bernhard Martin Samuelson, an Executive Engineer in the Public Works Department of Burma.

Associates.—Donald Ferguson, of Edinburgh.

James E. Firth, for 25 years an Associate of the Institute, and for a long period Sanitary Inspector at Halifax.

Arthur Banks Linford, of Wombwell, near Barnsley.

Mrs. Nicholina Frances Malone, of the Plaistow Nurses Home.

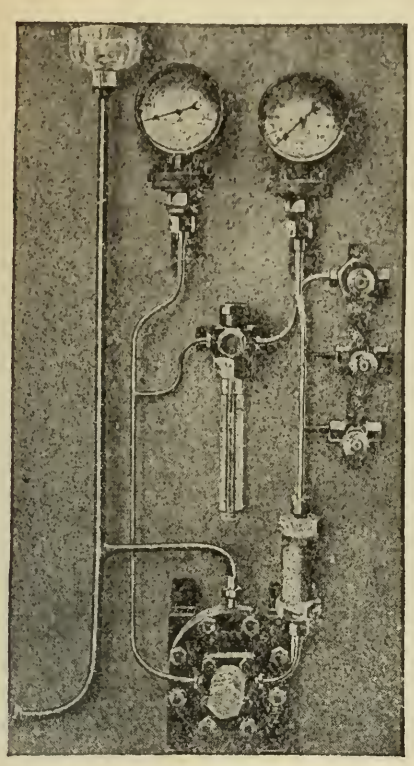
Hyam Nathan, of Geraldton, Western Australia.

Thomas Henry Negus, Surveyor and Sanitary Inspector to the Meriden Rural District Council for many years.

John Oliver Vaughan, of Hull, who had been an Associate for 24 years.

COLONIAL AND FOREIGN NOTES.

M. Auguste Mennes, Inspecteur Principal des Travaux d'Hygiène au Ministère de l'Intérieur, Belgium, visited the Institute and the Museum in October for the purpose of obtaining information regarding Sewage Disposal and Water Supply.



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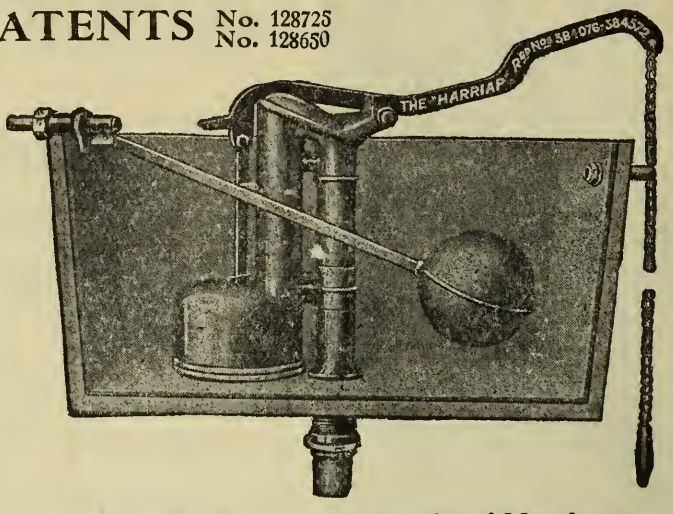

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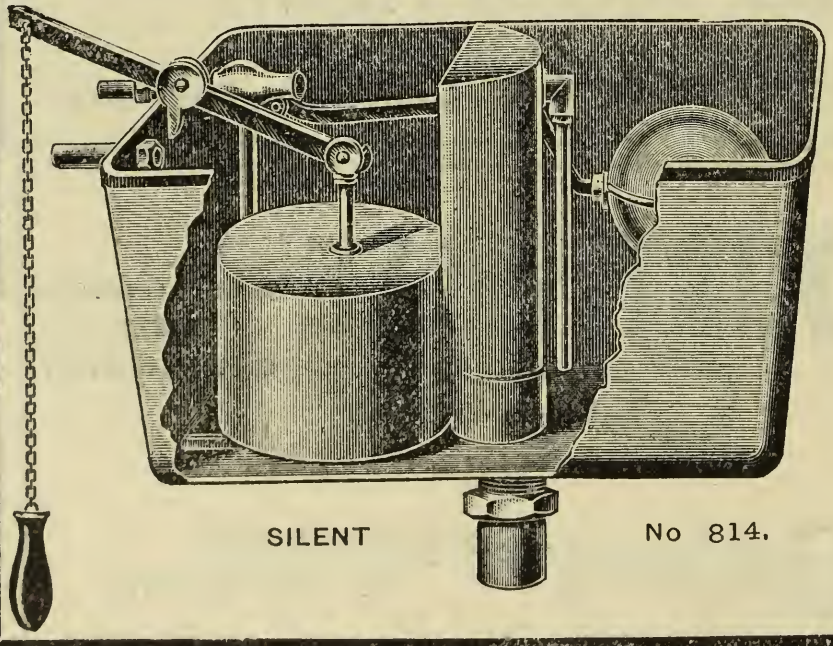

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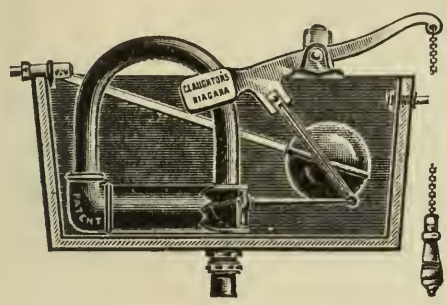

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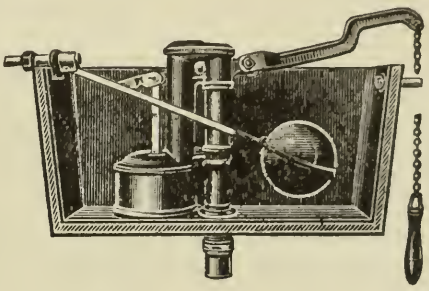

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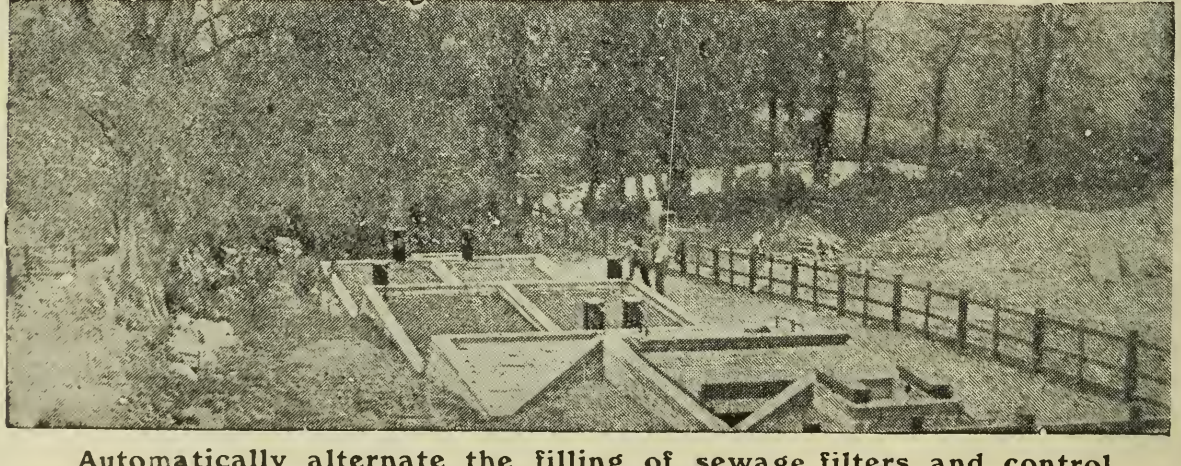

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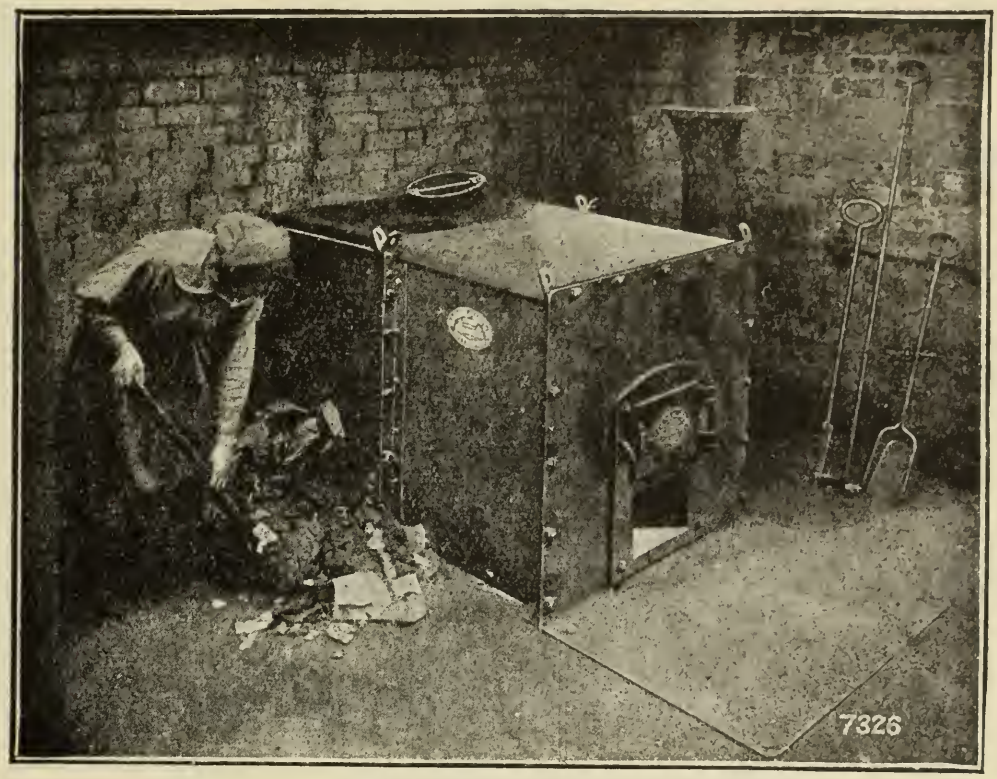

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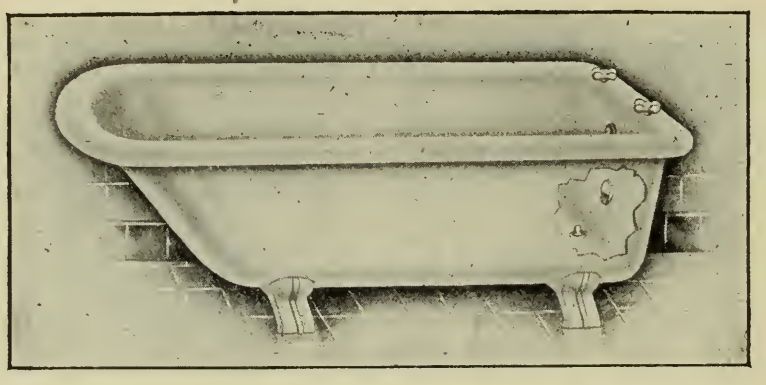

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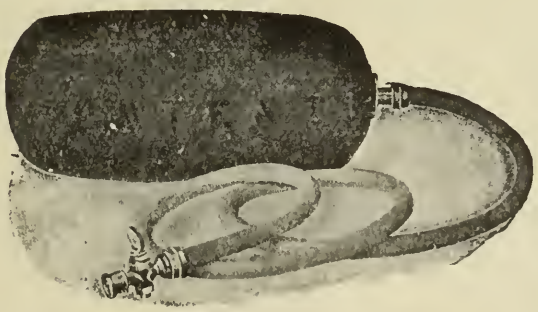

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